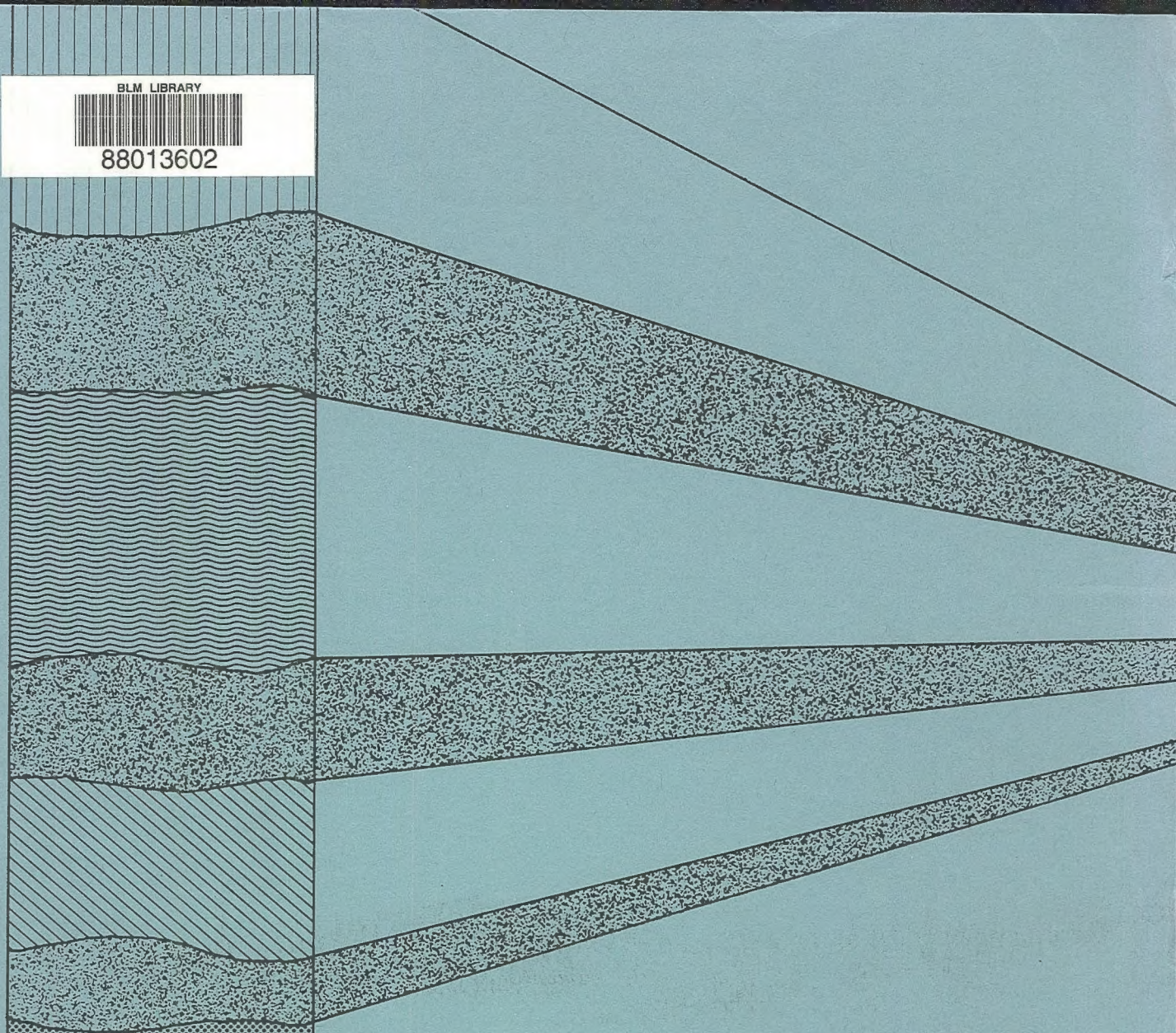
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FINAL ENVIRONMENTAL STATEMENT

FEDERAL COAL MANAGEMENT PROGRAM

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

Enclosed with this letter of introduction is the final environmental statement (FES) for the new Federal Coal Management Program.

This programmatic statement is based on information development by the Bureau of Land Management and the Department of the Interior. Information and data were supplied by Federal, State and local governmental departments and agencies, and non-governmental entities such as conservation and environmental groups, industrial organizations, mining companies, libraries, and others.

On December 15, 1978, Secretary Cecil D. Andrus released the draft version of this statement (DES) and urged the widest possible public participation in the review of the document. During January and February of 1979, the Department conducted special public informational meetings in 12 separate cities, followed by 10 formal public hearings to receive comments on the DES. During the extended, 60-day review period (a 45-day period is mandatory), the Department received and evaluated over 1600 separate comments on the DES.

The purpose of the statement is to address various alternatives for a Federal Coal Management Program, including a preferred program alternative, and to assess the possible impacts from the various alternatives. The statement is programmatic in scope and discusses the national and interregional impacts associated with the Federal Coal Management Program. Impact assessment includes coverage of 12 coal supply regions, 3 production levels (low, medium, and high), 7 alternative management strategies, 2 projection periods (1985 and 1990), 5 phases of the coal production and use cycle, and 27 impact categories. The statement also includes a set of proposed regulations which could be used to implement all or portions of each alternative management program. Availability of those regulations was announced in the March 19, 1979, edition of the Federal Register.

This statement will assist the Secretary in carring out President Carter's directive to manage Federal coal lands in an environmentally acceptable manner.

Sincerely yours,

Director

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FINAL ENVIRONMENTAL STATEMENT

FEDERAL COAL MANAGEMENT PROGRAM

APRIL 1979

PREPARED BY THE
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Frank Gregg

DIRECTOR, BUREAU OF LAND MANAGEMENT

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- Office of Coal Management; Bureau of Land Management
- Office of Coal Leasing, Planning, and Coordination; Assistant Secretary - Land and Water Resources
- Office of Policy Analysis; Assistant Secretary - Policy, Budget, and Administration

Assistance in the preparation of certain portions of this Final Environmental Statement was provided by the MITRE Corporation, McLean, Virginia.

Draft( ) Final(X) Environmental Statement

1. Type of Action: Administrative (X) Legislative ( )

2. Brief Description of Action : This final programmatic environmental statement considers the environmental impacts of seven alternatives for a Federal coal management program to be adopted by the Department of the Interior. The proposed action is the adoption of the preferred Federal coal management program. In addition to providing for the administration of existing leases (lease readjustments, assignments, relinguishments, etc.), the processing of preference right lease applications, the review of Federal lands to determine unsuitability for all or certain types of mining, and other coal management activities, the program would establish standards and procedures for determining when, where, and in what manner the right to mine coal owned by the United States government should, through competitive sales, be leased to parties who would cause the coal to be mined. As a part of the program, before competitive lease sales would be held, the Secretary of the Interior would determine whether there is a need for such sales in order to make federally-owned coal available for production. Determination of the need for leasing would be based mainly on analyses of expected coal production in relation to projected demand for coal.

Identification of Federal coal that can be considered for leasing would be done through the land use planning process of the Bureau of Land Management, Department of the Interior, under the Federal Land Policy and Management Act of 1976 and the Federal Coal Leasing Amendments Act of 1976, and the Forest Service, Department of Agriculture, under the Multiple-Use Sustained-Yield Act of 1960 and the National Forest Management Act of 1976. Selection of specific tracts of coal to be offered for lease and the administration of the lease sales would be managed by the Bureau of Land Management. Specific standards would be used to identify lands where mining Federal coal would cause unacceptable damage to lands or resources. Areas not found unsuitable for mining would be further evaluated and the value of potential coal development considered in comparison to other values, such as wildlife management, recreation, watershed protection, or stock grazing, which might be foreclosed or diminished if the coal were to be developed. From areas found to be acceptable for further consideration for coal leasing in the land use plans of the Federal land management agencies, tracts would be delineated. All tracts delineated in the planning units in each of eight Federal coal regions would be selected for possible leasing by ranking them region-wide on the basis of coal quantity and quality, cost of extraction, and social, economic, and environmental impacts of mining. Priority in selecting tracts to be offered for lease sales in each region would be assigned to those tracts which could be most productively developed with the least social, economic, and environmental damage.

A central feature of the preferred Federal coal management program would be emphasis on participation by the public and by state and local governments in all aspects of the program. Information, advice, and opinion would be sought from all parties interested in decisions about Federal coal management. Assessment of the need for leasing, establishment of coal production goals and leasing targets, application of standards for determining lands unsuitable for leasing, planning to decide which of those areas that could be leased should be leased rather than be put to other uses, and ranking and selection of tracts to be offered for lease sale would be conducted in an open, accountable way, in a process designed to make decisions as responsive as possible to suggestions from those interests most affected by the decisions. Consideration of social and economic consequences as evaluated by state governments would be given special weight when decisions about Federal coal management are made through participation of regional coal management teams.

3. Summary of Environmental Impacts: This is a programmatic environmental statement. The Federal coal management program would be established in June 1979. As a result of the operation of the program, decisions could be made that would result in competitive coal lease sales in some areas, deferral of decisions about whether leasing should take place in other areas, and the elimination of still other areas from further consideration as potential sites for leasing and mining of Federal coal.

The environmental impacts which are expected to result from implementation of the Federal coal management program will vary among regions and over time. In the short term, many regions will experience substantial increases in coal production for several years, with or without additional leasing. Demand for coal in those regions will lead producers to develop available reserves. Leasing under such circumstances would not add significantly to cumulative social, economic, and environmental impacts within the region, but could cause intra-regional shifts in specific production sites if producers responded to more attractive development opportunities created by the availability of new Federal leases. A decision not to lease in the next several years could also diminish or foreclose production opportunities in an area, causing producers to turn their attention to other reserves, within or outside of a given area, which could be developed without Federal leasing. Whether the environmental consequences of production shifts caused by a Federal coal management program, and the decision which would be made under the program to lease or not to lease in the next several years, would be generally more or less damaging to the environment could only be determined through analysis of specific management decisions. As described in this statement, such specific management decisions would be made only after land use planning and environmental analyses designed to minimize environmental damage have been conducted.

Over time, production from additional Federal leasing could account for a larger share of total national production, and so would be responsible for a larger percentage of the environmental consequences of production.

Decisions not to lease could severely limit the production of coal in the western United States. The social, economic, and environmental consequences of program decisions under such circumstances would depend on the type and location of energy sources that would be used as alternatives to coal from the western United States.

In this statement, the environmental consequences of implementation of a Federal coal management program are described on a national and inter-regional basis. While many impacts, both beneficial and damaging, can be directly attributed to coal production that would result from decisions made under such a program, a wide range of impacts would result from decisions about the transportation, conversion and use of coal. Furthermore, certain intra-regional impacts are too site-specific, or require management decisions not yet made which are too detailed or incapable of discernment, to be considered in a programmatic environmental impact statement. Thus, a tiered

structure of increasingly site-specific environmental analysis is proposed. The unavoidable national and inter-regional impacts of coal production that could be affected by decisions made under the program include:

- Subsidence of land could result from underground mining activities.
- Existing vegetation would be destroyed on sites cleared for development and surface mining, and wildlife habitat would be lost or temporarily displaced.
- Present agricultural use in some areas would be converted to residential, commercial or industrial uses.
- Industrial and municipal demand for water would increase; generally, water would be available for these uses but in some western states the new demands may compete with present water uses, and the competition will cause price increases that may cause economic problems for agricultural water users.
- Water quality may be lowered and totally dissolved and suspended solids would increase due to industrial return flows and construction activities.
- Aquifers may be disrupted and their long-term productivity could be reduced.
- Increases in emissions of sulfur oxides, nitrogen oxides, carbon monoxide, carbon dioxide, hydrocarbons, trace elements, and particulates would occur with some degradation of local and regional air quality and possible long-term climatic effects.
- Topographical features would be altered during construction and mining activities.
- There could be some loss of archaeological and historical sites.
- The present visual quality of the landscape would be changed as a result of new coal mining and cleaning facilities, transportation networks, coal conversion plants, transmission lines, and urban expansion.
- Population would increase in some areas and decrease in others.
- Educational, police and fire protection, sewage and water, recreational, and other public facilities and services would not keep pace with population increases in some regions, straining personnel and budget levels of local and state governments and lowering the local quality of life for some.
- Communities could lose their small town atmosphere and residents of rural areas would experience a change in their traditional life-styles.
- Transportation arteries, including rail lines, would experience heavier average daily traffic with significant impact at rail grade crossings.
- Employment increases would occur from coal development, and increased construction wages and investment in the impacted regions would lead to higher personal income, retail sales, and property values. This could also result in tight housing markets and inflation adversely affecting those persons on fixed incomes.
- Fatal accidents and disabling injuries would undoubtedly occur as a result of coal development activities.

4. Alternatives Considered: Considered in this environmental impact statement are seven alternatives: the preferred program, no new Federal leasing, issue preference right lease applications (PRLA'S) only, emergency leasing only, lease to meet industry indications of needs, lease to meet the United States Department of Energy production goals, and state determination of leasing levels. Numerous policy alternatives are capable of incorporation in various of the alternatives. Twelve coal regions are specified: Northern Appalachian Coal Region (Pennsylvania, Ohio, Maryland, West Virginia); Central Appalachian Coal Region (Virginia, Kentucky); Southern Appalachian Coal Region (Tennessee, Alabama); Eastern Interior Coal Region Illinois, Indiana, Kentucky), Western Interior Coal Region (Iowa, Kansas, Missouri, Nebraska, Arkansas, Oklahoma); Texas Coal Region (Texas, Louisiana); Denver-Raton Mesa Coal Region (Colorado, New Mexico); San Juan River Coal Region (Colorado, New Mexico); Uinta-Southwestern Utah Coal Region (Colorado, Utah); Green River - Hams Fork Coal Region (Colorado, Utah, Wyoming); Powder River Coal Region (Montana, Wyoming); and Fort Union Coal Region (Montana, North Dakota).

5. Comments on the draft environmental statement: Comments have been received from various individuals, organizations and governmental agencies indicated in Chapter 8.

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CHAPTER 1

INTRODUCTION AND BACKGROUND OF FEDERAL COAL MANAGEMENT PROGRAM AND ENVIRONMENTAL IMPACT STATEMENT

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CHAPTER 1

INTRODUCTION AND BACKGROUND OF FEDERAL COAL MANAGEMENT PROGRAM AND ENVIRONMENTAL IMPACT STATEMENT

1.1 INTRODUCTION

This environmental impact statement comes at a critical juncture in a long history of starts and stops for a Federal coal management program administered by the Department of the Interior. The purpose of this impact statement is to meet the Department's responsibilities under the National Environmental Policy Act of 1969 (NEPA), 83 Stat. 852, and to help the Department address four major questions: (1) Should a new Federal coal management program be adopted by the Department of the Interior; (2) How should the program be designed; (3) Is Federal coal leasing necessary to meet the Nation's future energy needs; and (4) What environmental impacts might result from the adoption of alternative new Federal coal management programs?

Why these questions need resolution at this time can be placed in a proper perspective through a brief review of the history of Federal coal policies and activities. From the beginning of Federal land ownership, a policy of disposal of public domain lands was followed. In the century and a half during which this policy held sway, 1.1 billion acres, or more than half of the public domain, was sold or granted to states and private owners. Until the early 1900's, the policy of disposal of Federal lands included the practice of transferring coal and other mineral resources to private owners. However, with the passage of various mineral reservation statutes and the Mineral Leasing Act of 1920, 41 Stat. 438, it became Federal policy to retain and lease rather than to sell Federally-owned coal. Under a leasing system, only the leased mineral, and not the land itself or other associated resources, becomes the property of the lessee. Even that property right is conditioned on lessee compliance with stipulations to protect the mined land, and requirements that the mineral be diligently developed. Particularly between 1955 and 1970, large amounts of Federal coal were leased under the Mineral Leasing Act with little regard to the need for leasing, or when (or if) the leases would be developed. There was no enforcement of the Mineral Leasing Act's requirement that leases be diligently developed.

A Bureau of Land Management (BLM) study [1] issued in 1970 reported that, while the amount of Federal coal under lease was rapidly increasing, production was declining. As a result of that study, the Department of the Interior, in May 1971, imposed an informal leasing moratorium in order to reassess its leasing policy. In February 1973, the Secretary of the Interior instituted a formal leasing moratorium and announced his intention to establish a new coal leasing policy. In the short term, the Department would issue leases only to avoid losing coal where it would be bypassed, to maintain existing coal operations, or to provide reserves for production needed in the near future.

The newly designed long-term leasing program was presented in the Department of the Interior's May 1974 draft environmental impact statement on its proposed coal leasing program [2]. The heart of the program was the Energy Minerals Allocation Recommendation System (EMARS I), under which the Department of the Interior would specify leasing needs on the basis of estimates of national energy requirements. The final environmental impact statement issued in September 1975 modified the system to the Energy Minerals Activity Recommendation System (EMARS II)[3]. Under the revised program, the Department adopted procedures which made greater use of industry nominations of leasing tracts and placed a much stronger emphasis on market determination of the amounts and location of future Federal coal to be leased.

The new Federal coal leasing program was short-lived. It was altered by statute and halted by litigation. From 1975 on, the development of a Federal coal management program has been significantly influenced by actions of each branch of government. Congress enacted four major

statutes with important consequences for Federal coal management. The first, the Federal Coal Leasing Amendments Act of 1976 (FCLAA), 90 Stat. 1088, passed in August 1976 over President Ford's veto, is designed to correct the leasing problems that had been experienced under the Mineral Leasing Act of 1920. The Federal Land Policy and Management Act of 1976 (FLPMA), 90 Stat. 2743, passed in October 1976, provides the Bureau of Land Management with a modern management mandate, including requirements for land use planning. The third major statute was the Surface Mining Control and Reclamation Act of 1977 (SMCRA), 91 Stat. 445, passed in August 1977. SMCRA, a result of Congressional concern over the adverse environmental effects associated with the significant shift in technology from underground to surface coal mining methods, requires control over these effects by the Federal and state governments. Finally, the Department of Energy Organization Act (DOE Act), 91 Stat. 565, also passed in August 1977, transferred from the Department of the Interior to the Department of Energy several important coal-related responsibilities, including issuance of regulations governing diligent development and bidding systems.

The Judiciary has provided guidance for the preparation of a new Federal coal management program, particularly in two recent decisions. The Supreme Court's 1976 decision, *Sierra Club v. Kleppe,* 427 U.S. 390, provided judicial instruction concerning what kind of environmental review must accompany major coal management decisions. Of more direct importance, however, is the decision in *NRDC v. Hughes,* 437 F.Supp. 981 (D.D.C. 1977), *amended,* 454 F. Supp. 148 (D.D.C. 1978), *appeal pending.* The court's order enjoined most Federal coal leasing activity until the Department of the Interior issues supplemental draft and final environmental impact statements on its coal management program. The Department has prepared this statement to comply with the environmental impact requirements of Section 102 (2)(C) of NEPA and that court order.

This discussion provides a brief overview of the recent history of Federal coal management activities. The background of Federal leasing, beginning with the Mineral Leasing Act of 1920, is presented in more detail in subsequent sections of this chapter.

1.1.1 Purpose of Final Environmental Impact Statement

This statement addresses the overall national and inter-regional environmental impacts of a Federal coal management program administered by the Department of the Interior.

1.1.2 Summary of Program Alternatives

Seven broad Federal coal management program alternatives, including a preferred program, are analyzed in this statement. Unlike most impact statements prepared by the Department and other Federal agencies, a proposed "action" and its alternatives are not treated in separate chapters. Rather, the statement presents a series of alternatives, one of which is tentatively "preferred" by the Department. Major subalternatives are also described and analyzed. This is consistent with the Secretary of the Interior's desire that the Department critically evaluate its entire coal management process. An integral part of this evaluation is and will continue to be comments from interested parties, including other Federal agencies, state and local governments, private and public organizations, and concerned individuals. Furthermore, additional public comments will be invited and considered during the program decision-making process which will follow issuance of this final statement.

A brief overview of the program alternatives follows. A more detailed description is contained in Chapter 3.

- *Preferred Alternative.* Decisions to lease Federal coal would be made as an integral part of the Federal land planning process. Federal lands would be considered for leasing which have not been found unsuitable for coal mining or more valuable for resource protection or other development activities in the land use planning process of the Federal land management agencies. In the activity planning process, tracts would be delineated, ranked on the basis of coal quality, cost, and environmental, social, and economic effects and selected for sale by regional coal teams. Regional leasing targets, derived from production goals submitted biennially by the Department of Energy and comments received from the states, industry, and the public, would be applied during the activity planning process

to ensure that sufficient tracts would be ranked and selected to meet national energy needs. The preferred alternative is similar to EMARS I as proposed in the Department's 1974 draft programmatic environmental impact statement on the Federal coal leasing program (see Section 1.2.4) [2] in that both rely on national energy projections to establish how much coal is to be leased. The preferred alternative, however, differs markedly from EMARS I by, among other things, placing greater emphasis on land-use planning and consultation with the states than did the earlier proposal.

- *No new Federal Leasing.* No new Federal coal would be leased until at least 1985, including coal needed for by-pass situations or to maintain existing operations (see Section 1.2.6 for description of terms). Preference right lease applications (PRLAs) would be either rejected, not processed, exchanged for other mineral leases, or purchased.
- *Process Outstanding Noncompetitive Coal Lease Applications (PRLAs).* Leasing until at least 1985 would be limited to PRLAs which meet the commercial quantities test.
- *Emergency Leasing.* There would be limited competitive leasing and issuing of PRLAs to prevent coal from being bypassed and to maintain existing coal mining operations. The need for new competitive leasing would be reviewed in 1985. This option is a continuation of the status quo and would be similar to the type of leasing permitted under *NRDC* v. *Hughes.* (See Section 1.2.6 for a further explanation of this policy.)
- *Satisfy Industry Indications of Need.* This alternative is effectively the Energy Minerals Activity Recommendation System (EMARS II), as proposed in the Department's 1975 final programmatic environmental impact statement on the Federal coal leasing program (see Section 1.2.4) [3], and as adopted in regulations published in the Federal Register (42 Federal Register 4422, corrected 42 Federal Register 12546 (1977)).
- *State Determination of Leasing Levels.* The states would have the responsibility to determine the timing and extent of new leasing.
- *Lease to meet Department of Energy (DOE) Production Goals.* Under this alternative, no adjustments (as envisioned in the preferred alternative) would be made to the DOE production goals to reflect the Department's diverse responsibilities or the views received from consulting with the states, industry, and the public. Leasing decisions would be required to meet the DOE goals.

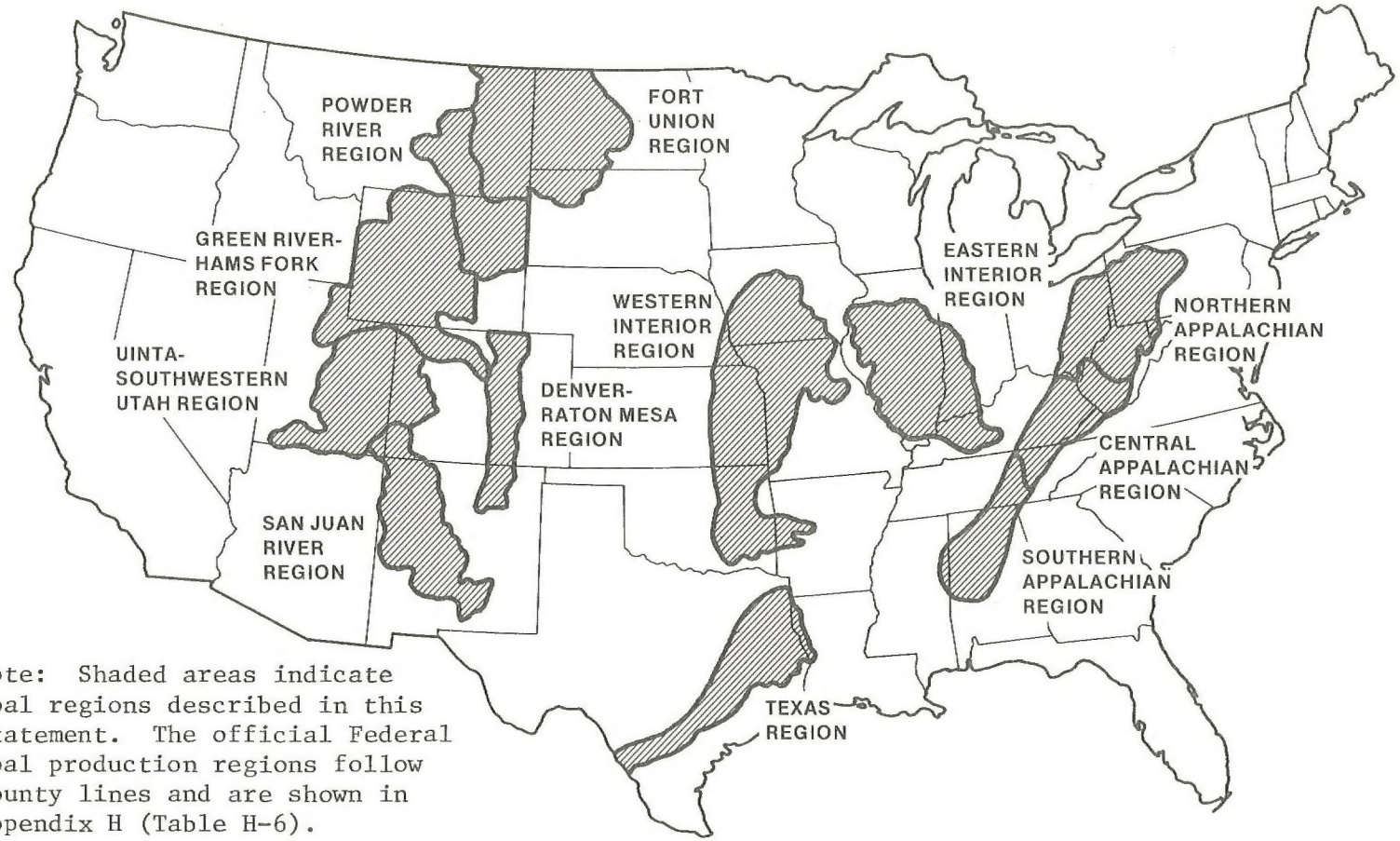
In the implementation of any of these alternatives, the Department would assure compliance with all new statutory requirements including those for land use planning, lease terms, reclamation of mined lands, and payment of fair market value for competitive leases.

1.1.3 Approach to Environmental Impact Statement

This is a programmatic statement which assesses the national impacts of a Federal coal management program and related Federal coal policies. The statement covers all major national aspects of a preferred Federal coal management program and alternatives, and assesses the effects of the alternatives in twelve specific coal regions (see Figure 1-1). Thus, the issues analyzed are quite different from those discussed for a particular lease area. A broad statement of overall impacts of the program will allow the Department to make decisions concerning national and multiregional questions.

The statement uses a general predictive approach based on national and regional data and makes necessary assumptions where firm data are not available. Reasonable forecasting is implicit in NEPA. With 27 coal states and 12 regions which could be directly affected by coal extraction, and other states indirectly affected by the consumptive use of coal, data used in this statement must be generic and cannot be site specific; however, impacts are quantified, wherever possible, to display the differences between the various alternatives. Nonquantifiable aspects (such as aesthetics, lifestyle changes, and cultural values) are also addressed.

The impact analysis uses two principal models. One is the Department of Energy's National Coal Model, which predicts the high, moderate, and low coal demands for coal regions, in 1985 and 1990, under various demand scenarios and constraints.



Note: Shaded areas indicate coal regions described in this statement. The official Federal coal production regions follow county lines and are shown in Appendix H (Table H-6).

FIGURE 1-1
TWELVE COAL SUPPLY REGIONS OF THE UNITED STATES

The second model used is the Department's Coal Impact Estimation Program which relates quantifiable "environmental loading factors" to predicted coal production and use levels by region. This model was developed by the MITRE Corporation for the Department and is more fully explained in Chapter 5.

This statement addresses the total national demand for coal, and impacts associated with Federal and non-Federal coal development. Consideration of non-Federal coal resources is necessary, first, to place impacts of the Federal coal management program in a broader perspective; and second, because Federal actions have the potential to shift production between private and public coal. Presentation of total coal demand establishes a base-line from which environmental analysis may proceed.

The content and format of this statement, as outlined in the table of contents, represents a combination of approaches. It contains a modified standard format as required in the BLM Manual, Section 1792, revised to incorporate some of the principles of the Council on Environmental Quality's (CEQ) recent NEPA regulations [4], with emphasis on the requirements of the *NRDC v. Hughes* court order. This chapter provides the background to this statement. Included is a discussion of prior and current coal policy directives and applicable laws and regulations. The importance of coal as an energy resource is discussed in Chapter 2. Chapter 2 also describes the characteristics of coal development activities as well as how coal development might be affected by the development of other energy sources. Past and projected coal production levels and the need for additional Federal coal leasing are then addressed.

Chapter 3 presents the issues and options identified during the course of the Department's review of its coal management responsibilities, the Secretary of the Interior's preferences among the options, and alternatives to that program. Chapter 4 provides an overview of the existing environmental conditions in each of the twelve regions.

Chapter 5 assesses the environmental impacts related to the preferred and alternative coal management programs, including a comparative analysis of policy subalternatives. Chapters 6 and 7 contain the summary analyses required by Section 102(2)(C)(ii-v) of NEPA. Finally, the coordination activities involved in preparation of this statement are summarized in Chapter 8, including the Department's responses to comments on the draft environmental impact statement.

1.1.4 Relationship to Ongoing Regional Environmental Statements and Studies

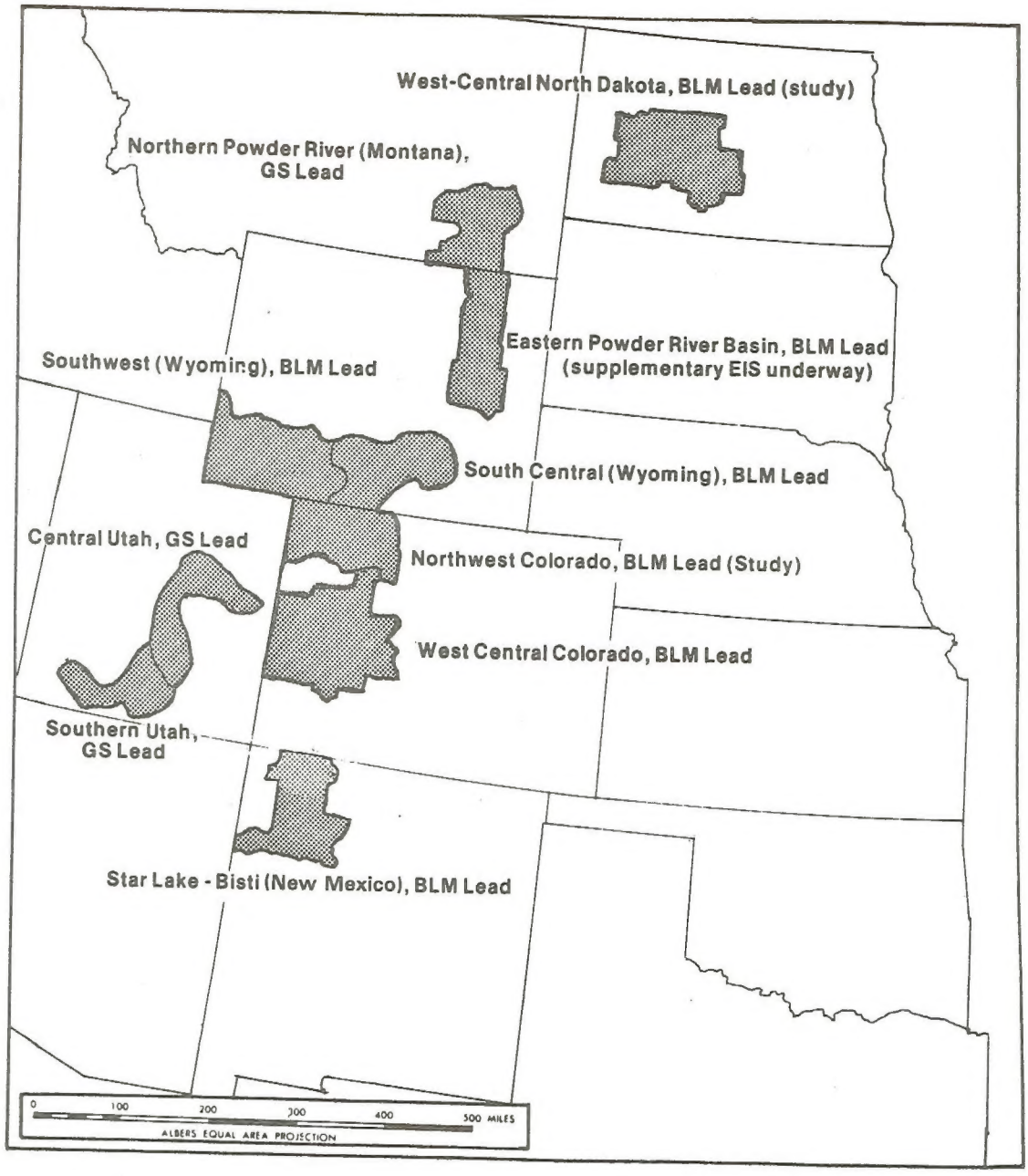
The Department is currently preparing comprehensive coal environmental impact statements on activities occurring in eight geographic areas. Under a policy formally adopted in 1976, this type of comprehensive analysis is called for whenever the Department is faced with multiple coal-related actions in a broad geographic area.

The areas covered by these statements were chosen after consideration of coal basin boundaries, drainage areas, areas of common reclamation characteristics, administrative boundaries, areas of economic interdependence, and other relevant factors. The regional statements include a broad, overview analysis of environmental impacts associated with current and potential coal development activities, as well as site-specific analyses of mine plans, and right-of-way permits for which administrative action is proposed. These statements also address related coal development activities not requiring specific Departmental approval, such as mine-mouth electrical generating or energy conversion facilities, and the expansion of existing or construction of new communities to accommodate coal-induced population increases. The eight areas covered by these statements are depicted in Figure 1-2. These areas are smaller than the twelve regions assessed in this statement. Table 1-1 summarizes pertinent coal development activities analyzed in the ongoing statements.

The Department will complete these ongoing statements; initiation of new statements of this type is contingent on program decisions which may be made after this final programmatic statement is published.

Additionally, for each individual coal lease and mining plan an environmental analysis is prepared to determine whether a detailed environmental impact statement is required. If associated impacts are significant within the meaning of NEPA, a site-specific statement is prepared, either separately or as part of a regional analysis.

Current Departmental policy for preparing environmental assessments and impact statements thus covers generic (programmatic), regional, and site-specific considerations. Proposals to modify



NOTE: "BLM Lead" signifies that the Bureau of Land Management has lead agency responsibility for preparing the document. "GS Lead" signifies that the U.S. Geological Survey has lead agency responsibility for preparing the document.

FIGURE 1-2

REGIONAL AREAS COVERED BY
ENVIRONMENTAL IMPACT STATEMENTS OR STUDIES

TABLE 1-1

SITE-SPECIFIC PROPOSED ACTIONS
IN THE ONGOING REGIONAL ENVIRONMENTAL STATEMENTS

REGIONAL STATEMENT	PROPOSED SITE-SPECIFIC ACTIONS	
	MINING AND RECLAMATION PLANS	RIGHTS-OF WAY APPLICATIONS
Southwest Wyoming	5	13
South Central Wyoming	3	9
Eastern Powder River, Wyoming, Supplement	1	0
Southern Utah	3	0
Central Utah	7	15
West Central Colorado	6	0
Star Lake-Bisti New Mexico	0	2
Northern Powder River, Montana	2	1
TOTAL	27	40

NOTE: Two additional Environmental Planning Studies, the Northwest Colorado Environment Planning Study and the West Central North Dakota Environmental Planning Study, are also underway.

this approach as part of a new coal management program are discussed in Chapter 3.

1.1.5 General Purpose of Coal Management Policy

The need for a new look at the Federal coal management program is related to three broad conditions. The first is the Nation's serious energy problem, characterized by declining domestic oil and gas resources and limited alternatives. A national policy goal has been advanced to reduce reliance on imported oil. The National Energy Plan (NEP) [5] announced by President Carter in April 1977 presents detailed steps to be taken to achieve this goal. Salient features of the NEP include energy conservation, rational fuel pricing policies, and increased use of abundant domestic energy sources. Although coal comprises 90 percent of the country's fossil fuel reserve, only 18 percent of the national energy needs are met by coal. A cornerstone of the NEP is the goal of correcting this imbalance between coal reserves and consumption by doubling 1977 annual production by 1985. Coal from mines under Federal leases has accounted and is expected to continue to account for a significant share in the expanding use of this resource.

The second condition results from the failure of former coal management practices to address current concerns. Major concerns expressed both within and outside of the Department are the government's historically passive role in coal leasing decisions, lack of active control over production from Federal leases, absence of an effective system to ensure fair market return for the right to mine Federal coal, and the potential for serious social, economic, and ecological impacts of expanded coal production and use.

Finally, as briefly discussed in the introduction to this chapter, a reassessment of the coal management program has been precipitated by recent critical reviews of management practices by the Executive, Judicial, and Legislative branches of the Federal government.

1.2 HISTORICAL BACKGROUND

The Federal coal management program is concerned with the development of coal resources on public domain lands and acquired lands. The public domain refers to those lands which are subject to the public land laws of the United States. These lands were obtained primarily by cession, treaty, and purchase from other countries. Acquired lands are purchased by the United States from private owners after the lands became part of the United States.

Almost as fast as public domain was obtained, it was disposed of by the Federal government to further national goals. These dispositions provided rewards for soldiers and other deserving persons, encouragement for the rapid settlement and development of the western states, incentives for construction of railroads and canals, and many other purposes. Dispositions of public lands included more than 1.1 billion acres between 1781 and 1963.

Early development of Federal coal lands was governed by a law controlling land entry and sale [6]. Under this law a maximum of 160 acres could be granted to an individual; up to 640 acres were allowed to groups of four or more persons who had expended at least $5,000 in work and improvements, where mines were opened and improved, and when the group was in actual possession. Land payments ranged from $10 to $20 per acre, depending upon the distance from a railroad. A claimant who discovered minerals on public domain land received complete transfer of mineral ownership.

Another factor of some importance is that Congress granted nearly 100 million acres of land to railroads in the West. To settle the West, the building of railroads was essential. But to build a railroad was a costly venture, and railroad companies would not begin construction in what was then virtual wilderness without financial inducement. The grants of land by the government to the companies were that inducement.

Typically, Congress granted the railroads the odd-numbered sections on both sides of the proposed railroad right-of-way extending back from the right-of-way some 10 or 20 miles on each side of the railroad. The even-numbered sections, which were not conveyed to the railroad, continued to be in the public domain. By granting to the railroad the odd-numbered sections, and retaining the even-numbered sections, a checkerboard effect resulted. Although Congress probably expected that the granted land would be sold by the railroads to other citizens, and much of it has been conveyed, millions of acres of land or mineral interests have been retained by the original grantees. The resulting checkerboard land patterns

continue to influence western coal development, particularly in areas of Montana, Wyoming, and New Mexico.

1.2.1 Mineral Leasing Act of 1920

Enactment of the Mineral Leasing Act of 1920 provided a radical policy change for disposal of Federal coal lands. The new policy was to lease coal rather than sell it. Under the law, rights to explore, develop, and remove coal (and other specified minerals) were acquired through a lease or prospecting permit issued by the Bureau of Land Management.

In areas with no known coal deposits, the Secretary of the Interior could issue prospecting permits which entitled the permittee to the exclusive right to prospect for coal. Each permit had an initial two-year term, but could be extended for an additional two years if the permittee was unable, with the exercise of reasonable diligence, to determine the existence or workability of coal deposits in the area to which the permit applied. Permittees were entitled to preference right leases if they could demonstrate that the lands contained coal in commercial quantities.

Lands containing known coal deposits were not subject to prospecting permits. Instead, the lands were divided into leasing tracts and leases were awarded competitively. The competitive leasing system adopted by the Department was to award leases to the highest bidder. A lump sum cash bonus was collected at the time the lease was awarded.

The Mineral Leasing Act of 1920 restricted the acreage that could be held by one party in one state. Originally, the law allowed only one lease per person in each state. The limits were raised several times until, in 1964, they allowed a holding by any person of up to 46,080 acres (72 square miles) in one state.

Another feature of the Act was the requirement that leases be issued for an indeterminate period as long as conditions of diligent development and continuous operations were satisfied. These conditions could be waived if operations were interrupted by strikes, the elements, or casualties not attributable to the holder of the lease. Lease terms and conditions became subject to readjustment at the end of 20-year periods. In addition, leases could not be assigned or sublet without the consent of the Secretary of the Interior.

Other major provisions of the Mineral Leasing Act were:

- Leases could be modified by an additional 2,560 contiguous acres.
- Additional tracts up to 2,560 acres could be leased if workable deposits of coal would be exhausted within three years.
- Single leases could contain noncontiguous tracts.
- Royalties were set at not less than five cents a ton of coal.
- Annual rentals were set at not less than 25 cents, 50 cents, and $1 for the first, third through fifth, and sixth year onward from lease issuance, respectively.
- Limited licenses or permits could be issued to municipalities (without royalties) if the coal mined was sold without profit to local residents.

1.2.2 1971 Leasing Moratorium

Prior to 1970, the Department's coal leasing policy was reactive in nature. Lease requests were processed on a case-by-case basis. Particularly between 1955 and 1970, there was little consideration given to the total coal reserves under lease or to the need for additional leasing, and environmental impacts of leases were not addressed.

A 1970 Bureau of Land Management (BLM) study [1] reported that leased coal acreage on public lands in six western states – Colorado, New Mexico, North Dakota, Montana, Utah, and Wyoming – rose sharply from roughly 80,000 acres in 1945 to about 788,000 acres in 1970, but that Federal lease production dropped from 10 million tons of coal to 7.4 million tons in those same years. Of the total acreage under lease, over 90 percent was not producing coal. Similar conclusions on leasing problems were reached in a 1974 report by the Council on Economic Priorities [7].

As a result of the 1970 BLM study, the Department took a series of informal actions that resulted in no leases being issued between May 1971 and February 1973.

1.2.3 Short-Term Leasing Since 1973

The informal 1971 moratorium was replaced in February 1973 with a new coal leasing policy that embodied both short-term and long-term actions.

The long-term actions were to develop a comprehensive planning system to determine the size, timing, and location of future coal leases and to prepare an environmental impact statement for the Department's entire Federal coal leasing program.

The short-term actions included a complete moratorium on the issuance of new prospecting permits and a near-total moratorium on the issuance of new Federal coal leases. New leases would be issued only to maintain existing mines or to supply reserves for production in the near future. BLM issued instructions implementing this short-term policy in July 1973. The instructions stated that the decision to issue new leases would be based upon sufficient indications that a prospective lessee needs coal to satisfy an existing market and intends to begin development within three years.

Between 1974 and April 1, 1978, ten leases, covering 30,246 acres, were issued; most were for extensions of existing operations (see Table 1-2). Seven of these leases were producing coal by the end of 1977.

1.2.4 1975 Federal Coal Leasing Environmental Impact Statement

As part of its long-term leasing policy, the Department, in May 1974, issued a draft programmatic environmental impact statement [2].

The focus of the draft statement was on implementation of a new coal leasing system entitled the Energy Minerals Allocation Recommendation System (EMARS I). As described in the draft environmental statement, EMARS I was a three-part system: (1) allocation, (2) tract selection, and (3) leasing. During the allocation process, Federal agencies were to relate inventoried Federal coal resources to projections of coal-related energy needs. Total national energy needs were to be disaggregated into regional demands for coal. In the tract selection phase, Federal coal leasing targets would be established in each coal region. These targets would be derived in part from total national projections for coal-based energy needs. Tracts would be selected to meet the leasing targets. The leasing phase was to begin with detailed pre-planning of the coordinated mining and rehabilitation factors required for reclamation and subsequent surface resource management. This last phase would conclude with pre-sale evaluations, lease sales, post sale evaluation procedures, and, finally, lease issuance.

Approximately 2,100 sets of the two-volume draft statement were distributed to Federal and state agencies, U.S. Senators and Representatives, industry organizations, conservation groups, and others. Local public hearings were held and 117 formal comments on the draft statement were received.

Comments and testimony were received from a diverse group of individuals, organizations, companies, and agencies. Comments ranged from support of the statement to requests for a complete rewrite. However, two areas of major concern were readily apparent. These were the need (1) for a more detailed description of the proposed Federal coal leasing program, and (2) to further analyze whether additional Federal coal should be leased in light of the large acreage and coal reserves presently under lease but on which no development had taken place.

The Department's final programmatic environmental impact statement [3] was released in September 1975. The proposed action in that statement was changed from that in the draft statement. EMARS I was modified and retitled the Energy Minerals Activity Recommendation System (EMARS II). The three phases of this revised leasing system became: (1) nominations and programming, (2) scheduling, and (3) leasing. While the system envisioned in the draft statement emphasized Interior Department identification of coal reserves to be considered for leasing, the revised EMARS II program involved annual industry nominations and public identification of areas of concern. Nominations would be accepted for any area, with industry providing information on where and how much coal to lease. Based on these nominations, the Department would prepare land use plans and environmental analyses, resolve or mitigate resource conflicts, and hold lease sales if coal development was found to be compatible with the environment. The reasons behind the changes in the program between draft and final statements were not provided.

The following points were offered in the final environmental impact statement to support continued leasing:

- Changing economic conditions made it probable that much of the coal under lease

TABLE 1-2

LEASES ISSUED BETWEEN 1974 and 1978

DATE OF ISSUANCE	STATE/ COUNTY	METHOD OF MINING	ACRES CURRENTLY UNDER LEASE	BLM SURFACE CONTROL ACRES	U.S. FOREST SERVICE SURFACE CONTROL ACRES	OTHER FEDERAL SURFACE CONTROL ACRES	NON-FEDERAL SURFACE CONTROL ACRES
1974	KY-McCreary	Underground	1,544	-----	1,544	-----	-----
1974	UT-Emery	Underground	1,360	-----	1,360	-----	-----
1974	AL-Fayette	Underground	2,388.24	-----	-----	-----	2,388
1974	PA-Indiana	Underground	50.62	-----	-----	51	-----
	PA-Indiana	Underground	29.66	-----	-----	30	-----
1975	KY-Clay	Underground	361.83	-----	362	-----	-----
1975	CO-Routt	Both	474.93	-----	-----	-----	475
1976	WY-Sweetwater	Both	14,902.11	14,822	-----	-----	80
1977	UT-Sevier	Underground	8,823.88	295	8,528	-----	-----
1978	CO-Delta	Underground	310.51	311	-----	-----	-----
			30,245.78	15,428	11,794	81	2,943

Note: Does not include leases issued after April 1, 1978.

in 1975 was no longer suitable for development.
- Diligence requirements extended to existing leases would cause production or relinquishment over a period of a few years.
- Additional leasing might be required to avoid increases in energy costs.
- Some existing leases might be environmentally unsuitable for development, and leasing in new areas might be substituted for leases in unsuitable areas, thereby decreasing the relative value of the latter leases and possibly causing their relinquishment.
- Additional leasing would provide access to Federal coal for firms interested in penetrating new market areas but not currently holding Federal coal leases.

Analysis of the environmental impacts associated with the leasing program was quite brief in the final environmental impact statement.

On October 21, 1975, the validity of the statement was challenged in *NRDC v. Hughes* in the U.S. District Court for the District of Columbia (see Section 1.2.6 for a discussion of this lawsuit).

1.2.5 Sierra Club v. Kleppe

The decision in *Sierra Club v. Kleppe,* 427 U.S. 390 (1976), was the Supreme Court's first extensive treatment of NEPA's environmental impact statement requirements as they concern the Department's coal-related activities. As such, it provides constructive background to the discussion in Chapter 3 of this statement of the Department's policy options for incorporation of environmental analyses into the evolving Federal coal management program.

The litigation began in July 1973. The plaintiffs contended that Federal agencies could not allow further coal development in the Northern Great Plains area (encompassing portions of four states – northeastern Wyoming, eastern Montana, western North Dakota, and western South Dakota) without preparing a comprehensive environmental impact statement for the entire region. The United States Court of Appeals for the District of Columbia Circuit found that there was no Federal regional plan or program for coal development in the Northern Great Plains area. Nevertheless, the court concluded that the involved Federal agencies "contemplated" such a regional plan. The agencies were ordered to inform the District Court of their role in the further development of the region; if they decided to control that development, an environmental impact statement would be required. The Court of Appeals also enjoined the Department of the Interior from approving the four mining plans analyzed in the multiproject Eastern Powder River Coal Basin Regional Impact Statement, which covered only a two-county area in Wyoming.

The Court further proposed a four-part balancing test for determining when preparation of an environmental impact statement must begin during contemplation of a plan or action. Factors to be considered were:
- Likelihood that the program would soon be initiated.
- Extent to which information is available on the effects of program implementation.
- Extent to which irreversible commitments of resources are being made or options precluded.
- Severity of resultant environmental impacts.

In reversing the Court of Appeals decision, the Supreme Court held that NEPA did not require a "regional" environmental impact statement for the Northern Great Plains area where no proposed action was pending. It also found that an environmental impact statement is not required until the time at which a Federal agency makes a recommendation or report on a proposal for Federal action. Mere contemplation of action does not trigger the need for a statement and, thus, the Court of Appeals balancing test had no statutory authority. The Court further indicated that NEPA may require comprehensive statements where several related projects are pending at the same time, although an individual project may proceed where covered by an adequate statement. Finally, the Court noted that the choice of a region to be covered is largely that of the agency.

1.2.6 NRDC v. Hughes

On September 27, 1977, the U.S. District Court for the District of Columbia ruled in *NRDC v. Hughes* (cited previously) that the 1975 final coal leasing programmatic environmental impact statement was inadequate and enjoined the Department from "taking any steps whatsoever directly or indirectly to implement the new coal leasing

program including calling for the nominations of tracts for Federal coal leasing and issuing any leases, except when the proposed lease is required to maintain an existing mining operation at the present levels of production or is necessary to provide reserves needed to meet existing contracts and the extent of the proposed lease is not greater than is required to meet these two criteria for more than three years in the future." The court stated that the standard should be applied to both noncompetitive preference right lease applications (PRLAs) and competitive leases.

The court ordered the Department to issue an official press release, publish a notice in the Federal Register, and take other steps appropriate to receive additional comments on the 1975 statement. The Department was further ordered to prepare a draft supplement to the 1975 statement, receive comments on the supplement, and prepare a new final statement. These documents were to discuss the issues which the court identified as being deficient.

Prior to the entry of the order, the Department had already begun to review its coal management policies and activities and to determine what, if any, coal management program it should adopt. As a result of this internal review process, the Department prepared a series of option papers on the various elements which might comprise a coal management program. In a series of decisions beginning in October 1977 and concluding in November 1978, the Secretary and Under Secretary chose what is described in this statement as a preferred Federal coal management program. Because the Department's preferred program alternative is no longer the EMARS II program described in the 1975 statement and because there have been significant changes in statutory and Presidental policy and in available data, particularly as to the need for new coal leasing, the Department decided not to prepare a supplement to the original environmental impact statement but to write an entirely new statement. Both departmental and public review will be aided by this new statement. To the extent an entirely new integrated statement has been prepared instead of a supplement, the Department has exceeded the court's requirements by preparing an entirely new, comprehensive statement instead of a supplement. This statement responds to all the major concerns expressed about and corrects the faults previously found in the 1975 statement.

Following the decision in *NRDC v. Hughes* and in accordance with the court order, the Department, in November 1977, solicited comments on the final statement, including the following questions:

- Is there a need for renewed Federal coal leasing?
- If there is a need, how should the leasing program be defined?
- If new Federal leasing should be undertaken, how would different types of Federal leasing programs affect the environment?

Over 100 comments were received from Federal agencies, state and local governments and agencies, coal industry representatives, and private individuals and organizations. Comments included criticisms of the final environmental impact statement and suggestions on preparation of an improved statement, as well as responses to the three questions listed above. Major suggestions offered for an improved statement included:

- Further analyses of the need for renewed Federal coal leasing and a clearer description of the proposed leasing program.
- Detailed analysis of potential environmental, social, and economic impacts of renewed leasing and alternative leasing programs.
- Consideration of current data and recent legislation (e.g., the Surface Mining Control and Reclamation Act of 1977, Federal Coal Leasing Amendments Act of 1976, and 1977 Amendments to the Clean Air Act).
- Consideration of the impacts of processing, transportation, and ultimate use of coal.
- Improved consideration of alternative energy sources (e.g., nuclear, solar, geothermal, wind, and conservation)
- Consideration of state coal-related policies.
- Definition of the role of more detailed regional and site-specific environmental impact statements.

These comments were summarized in Chapter 8 of the draft version of this environmental impact statement and responses to them were integrated into its text, as well as the text of this statement.

Although the Department initially filed a notice of appeal of the court's decision, the District Court approved a settlement of the case on June

14, 1978. The amended order permitted substantially more leasing before issuance of this new programmatic environmental impact statement than would have been allowed under the court's initial standards. The standards will remain in effect until the Department files this programmatic statement and the Secretary decides whether to adopt a program. Utah Power and Light Company has appealed the order to the Court of Appeals for the District of Columbia.

The agreement embodied in the amended order permits leasing under any of the following six standards:

By-pass leases are permitted where Federal coal may be otherwise lost if it is not developed by an existing mine because subsequent costs (either economic or environmental) would be much higher. Up to five years of reserves may be included in a lease issued under this provision. To qualify for a lease, mining operations must have been in existence on September 27, 1977.

Employment leases may be issued in order to maintain production and employment in existing mines on September 27, 1977, which are running short of reserves needed to maintain past production or where additional reserves are needed to meet existing contracts. Up to eight years of reserves may be included in a lease under this provision.

ERDA project leases of no more than 500,000 tons annual production may be issued to support Energy Research and Development Administration (ERDA) projects authorized under Section 908 of SMCRA. Leasing is allowed if the technology assessed cannot be demonstrated on existing leases or private coal holdings.

Lease exchanges are permitted to implement exchanges for Federal leases in alluvial valley floors under Section 510(b)(5) of SMCRA.

Hardship Leases involve seven particular lease applications specified in the agreement as being not subject to the injunction regardless of any other particular standard. The basis for these leases varies, but each has some special circumstance or hardship which justified proceeding with lease issuance in advance of the completion of this statement.

Noncompetitive (preference right) lease applications may be processed but not issued for the 20 PRLAs having the least environmental impact. Other than these 20 (and any applications which meet one of the court's other standards), the Department may not process any PRLAs. Preference is to be given to PRLAs for tracts containing 90 percent of reserves which can be mined by deep mining and PRLAs for tracts which would not require substantial additional transportation facilities or water storage or supply systems, and would not involve substantial new industrial development, in the region. All activities, including completion of the commercial quantities test and necessary environmental analyses, are permitted under this standard.

In addition to the six standards, the agreement allows the Department to process, but not issue, a lease based on an application by the Edison Development Corporation.

Although the total amount of coal to be leased under all of these provisions cannot be stated precisely, the Department estimates as many as 35 leases involving a total of 275 to 300 million tons of coal reserves could be involved. If these leases were granted, the increased annual production from Federal lands could be as much as 13 to 17 million tons. By comparison, approximately 96 million tons of coal were produced from mines on or including Federal leases in 1977. The original court order would have permitted the issuance of only six leases which would have resulted in approximately 10 million tons of production. As of April 1, 1978, 13 leases have been offered for sale under the amended order covering 6,442 acres and 53 million tons.

The modified order will enable the Department to achieve production in areas where needs are critical and to avoid unnecessary loss of Federal coal resources in by-pass situations. In addition, the settlement allows the Department to continue with the overview portion of the regional environmental impact statements. Although only lease proposals meeting the revised short-term standards will be studied on a site-specific basis, the regional environmental impact statements will address the social, economic, and environmental effects of increased coal production in particular areas, including impacts which could occur under various leasing levels. This information will be useful both to this programmatic environmental impact statement and to subsequent program decisions.

1.2.7 NRDC V. BERKLUND

The rights of holders of PRLAs was recently addressed in related litigation. The issue in *NRDC v. Berklund,* 454 F. Supp. 925 (D.D.C. 1978), *appeal pending,* was whether the Secretary's duty to issue a noncompetitive lease to an otherwise qualified holder of a PRLA is mandatory or discretionary. The United States District Court for the District of Columbia ruled, on June 30, 1977, that the Secretary does not have discretion to reject PRLAs where coal has been found in commercial quantities. It also affirmed the validity of the May 7, 1976, regulations, 41 Federal Register 18848, and, in particular, the point that the cost of complying with lease terms is properly a part of a commercial quantities showing. However, if the issuance of a PRLA would constitute a major Federal action significantly affecting the quality of the human environment, an environmental impact statement must first be prepared. The plaintiffs (Natural Resources Defense Council and three other groups) and intervenor defendants (Utah Power and Light Company and Chaco Energy Company) have appealed this decision to the Court of Appeals for the District of Columbia. The Court is not expected to decide this case until late in 1979.

1.3 FEDERAL CONSTRAINTS ON AND AUTHORITIES FOR COAL MANAGEMENT PROGRAM

This section presents an overview of the major laws and regulations and the programs of Federal agencies which influence the development of Federal coal resources. Primary emphasis is on statutes which directly control leasing and mining activities. Other authorities are cited in less detail to provide a perspective on factors which may indirectly influence the demand for coal resources and the location and intensity of coal development and related activities.

1.3.1 Laws Governing Development of Federal Coal

1.3.1.1 Mineral Leasing Act and Federal Coal Leasing Amendments Act of 1976. The Department's concern in the early 1970's with the efficacy of its coal management program was shared by the Congress, particularly as it related to deficiencies in the coal provisions of the Mineral Leasing Act of 1920. Major deficiencies of the 1920 Act are discussed below [8,9]. (See also the discussion in Section 1.2.1).

1. Problems with 1920 Act

Speculation. While the 1920 Act provided for lease cancellation, no lease was ever cancelled for failure to develop. In addition, issuance of PRLAs made it possible to gain control of public resources for nominal payments to the Federal government. Slightly less than half of all Federal leases were issued with no competitive bidding [7]. Consequently, holding companies and energy resource speculators had entered the market for Federal coal in large numbers.

Lease Concentration. In 1976, approximately 57 percent of Federal acreage under lease was held by 15 leaseholders [10].

Fair Return to the Public. Under preference right leasing procedures, no competitive sales were held and lessees who discovered commercial quantities of coal had only to pay minimum royalties and rentals. Also, although more than 50 percent of all leases had been offered competitively, 72 percent of the competitive sales had either no bidder or only one bidder [7].

Social and Economic Impacts. When areas were newly opened to large-scale mining, state and local governments had the responsibility of providing needed public services. The 1920 Act provided that monies returned to state government from lease sales were to be used only for schools and roads. This restriction made it difficult for affected areas to meet the needs of their new inhabitants. The attendant problems were exacerbated by the "boom-bust" economic cycle associated with rapid resource development in rural areas.

Maximum Economic Recovery. Some lessees developed only the most easily reached surface deposits which yielded the highest profits. Other resources of coal less easily mined were sometimes left in place.

2. Congressional Response

The Congress responded to these problems with the passage, over President Ford's veto, in August 1976 of the Federal Coal Leasing Amendments Act (FCLAA). The broad purpose of the FCLAA is to provide a more orderly procedure for the leasing and development of coal presently owned by the United States.

Among the most significant requirements of the FCLAA governing the award and development of Federal leases are the following:

- All leasing must be by competitive bidding; no bids can be accepted which do not equal or exceed fair market value.
- Noncompetitive (preference right) leasing is abolished (subject to valid existing rights).
- Leases may be consolidated into logical mining units (LMUs) when needed to insure maximum economic recovery of the coal deposit; [1] all LMU reserves must be mined within 40 years.
- Diligent development and continuous operation is required (except continuous operation may be waived upon payment of advance royalties).
- Leases to a single person are limited to 100,000 acres nationwide (as well as 46,080 acres in a particular state).

Economic, social, and environmental deficiencies inherent in the 1920 Act were also addressed in the FCLAA. The Congress ratified the BLM practice of doing land use plans prior to issuing competitive leases and a comprehensive land use plan or its equivalent was ordinarily required prior to leasing. State shares of royalties were raised from 37 1/2 percent to 50 percent with the new portion of the monies available not just for construction of roads and schools but also for a wide range of public services and facilities in impacted areas. Finally, public bodies were entitled to have reserved a reasonable number of leasing tracts for their own energy production.

1.3.1.2 Federal Lands Policy and Management Act of 1976. Governing the activities of the Bureau of Land Management was a vast number of outmoded public land laws enacted when disposal and largely uncontrolled development of the public domain reflected then-current Federal policy. The Bureau's difficulty in carrying out its land management responsibilities under the statutes was examined in detail in the late 1960's by the Public Land Law Review Commission. After five years of extensive investigations, the Commission submitted its final report [11] to the President and the Congress. A major recommendation of the Commission was that the policy of large-scale disposal of public lands reflected by the majority of statutes then in force should be revised and that future disposal of public lands should be limited to only those lands which will provide maximum benefit for the general public in non-Federal ownership. Federal ownership should be retained for those lands whose values must be preserved so that they may be used and enjoyed by all Americans. The Commission also emphasized the need to develop a clear set of goals for the management and use of public lands.

The Federal Land Policy and Management Act (FLPMA) enacted in October 1976 embodied many of the Commission's recommendations. The purpose of FLPMA is to provide the first comprehensive statutory statement of purposes, goals, and authority for the use and management of the approximately 448 million acres of Federally-owned lands administered by the Secretary of the Interior through the BLM.

Title II of FLPMA provides BLM with a statutory framework for land use planning for public lands. In the development of land use plans, BLM must:

- Use the principles of multiple use and sustained yield[2]
- Give priority to the protection of areas of critical environmental concern (such as historic, cultural, or scenic values, fish and wildlife resources, etc.).
- Consider present as well as future uses of public lands.
- Coordinate planning activities with those of Federal, state, and local agencies.

The Act also confirms that the BLM may continue to rely on existing plans.

The Act further liberalized the use of mineral revenues by states and local governments by providing that the entire 50 percent of the funds received by the Federal government for the

[1] An LMU, simply stated, is an area of land that will be mined as a single unit. The statutory definition is "an area of land in which the coal resources can be developed in an efficient, economical, and orderly manner as a unit with due regard to conservation of coal reserves and other resources. A logical mining unit may consist of one or more Federal leaseholds, and may include intervening or adjacent lands in which the United States does not own the coal resource, but all the lands in a logical mining unit must be under the effective control of a single operator, be able to be developed and operated as a single operation, and be contiguous."

[2] "Multiple-use" means the combination of resource values that consider changing needs and conditions, long-term needs for renewable and non-renewable resources, land productivity, environmental values, and economic return. "Sustained yield" means the achievement and maintenance in perpetuity of a high-level output of public lands natural resources consistent with multiple use.

development of leasable minerals on Federal land, which the FCLAA had provided to the states and local governments, could be used for any public purpose and by establishing a program to provide low interest loans to states and local governments to be impacted by Federal land mineral development activities. Proposed regulations to carry out the loan program were recently published, 43 Federal Register 49018 (1978).

FLPMA also requires the Department to review all BLM lands for potential designation as wilderness. The major steps in the process are inventory, identification of wilderness study areas, Presidential recommendations, and formal Congressional designation. Proposed procedures and requirements for interior management were published in 44 Federal Register 2699 (1979).

1.3.1.3 Surface Mining Control and Reclamation Act of 1977. The Surface Mining Control and Reclamation Act (SMCRA) was passed in August 1977 in response to concern over the extensive environmental damage caused by all coal mining and to technological and economic changes which now favor surface over underground mining. By 1976, over 60 percent of the coal produced nationally came from surface mines.

Surface coal mining activities have imposed large social and environmental costs in many areas of the country in the form of unreclaimed lands, diminished agricultural productivity, water pollution, erosion, floods, slope failures, loss of fish and wildlife resources, and a decline in natural beauty.

In the western coalfields, many of which are in arid or semi-arid areas, the environmental problems associated with surface mining are significant. Erosion rates on western range lands are among the highest in the United States for upland areas not under cultivation. The arid climate provides minimal moisture for a protective vegetative cover, and once this fragile vegetative cover has been disturbed, its restoration is difficult [12]. Furthermore, in most of the western coalfields the coal beds which lie close to the surface are also aquifers. Removal of the coal by surface mining operations could intersect those aquifers which are the source of water for many wells. Flow patterns in such aquifers could be changed, resulting in reduced availability of water for other uses.

In passing SMCRA, the Congress recognized that many states already had laws to regulate surface coal mining operations. However, most existing state laws and Federal regulations as well for surface mining and reclamation were inadequate in that they were tailored to suit ongoing mining practices, and did not require modification of mining practices to meet established environmental standards. Regardless of the adequacy of state mining and reclamation laws, the Congress felt that they were not fully enforced, partly from a lack of funding and manpower to adequately ensure compliance. As a result, violations of the law and regulations were frequent.

SMCRA, therefore, established uniform minimum Federal standards for regulating surface mining and reclamation activities throughout the country on Federal, state, and private lands, and for assuring adequate protection from the environmental impacts of surface mining in all states. The states can assume the primary responsibilities for administration and enforcement of the act under Federally-approved state programs. The Secretary must approve state programs; the Department will assume administrative responsibilities if a state program under the act is found to be inadequate.

The Department is responsible for enforcing reclamation requirements on Federal leases through a Federal lands program. SMCRA also gives a state the right to enforce reclamation requirements on Federal land if it enters into a cooperative agreement with the Department. If this occurs, Federal lessees in that state will have to comply with those requirements rather than those which would be Federally-enforced in the Federal lands program.

The Act has several features directly relevant to the coal management program. While FLPMA and FCLAA are applicable only to Federal coal and surface estates, SMCRA applies to all surface mining operations, whether Federal, state, or private. Thus, many of the prior advantages of developing private coal resources (such as reduced administrative burdens and related environmental and reclamation standards) have been eliminated. Of particular importance to this environmental impact statement are the Act's provisions regarding environmental protection performance standards (Section 515) and designation of areas unsuitable for surface coal mining (Section 522). A synopsis of these sections follows.

Section 515's performance standards are minimum standards applicable to all surface coal

mining and reclamation operations. These standards include:

- Maximum utilization and conservation of the solid fuel resource being recovered.
- Restoration of disturbed land to support the same or better conditions.
- Restoration of the approximate original land contour.
- Stabilization and protection of all surface areas.
- Protection of prime farmlands through specific reclamation techniques.
- Minimization of disturbances to the existing hydrological balance.
- Limitation on mining of steep slopes.

Section 522 of SMCRA establishes a procedure to designate lands unsuitable for all or certain types of coal mining operations. The Secretary of the Interior determines unsuitability on Federal lands. The states have authority to determine unsuitability for non-Federal lands. Areas on both Federal and non-Federal lands may be designated unsuitable if, upon petition, the Secretary determines that reclamation of disturbed lands is not economically or technologically feasible. Areas may also be classified unsuitable if mining operations will:

- Be incompatible with existing land use plans.
- Significantly affect important fragile or historic lands.
- Result in substantial loss or reduction in the productivity of renewable resource lands which produce food or fiber.
- Substantially endanger life and property in natural hazard lands.

Unsuitability designations must be preceded by a report addressing an area's potential coal resources, the demand for these resources, and the impact of designation on the environment, the economy, and the supply of coal. In addition, as part of its obligation under Section 522 of SMCRA, the Department of the Interior must review all Federal lands for unsuitability for all or certain types of coal development, although no formal "designation" of unsuitability is made as part of this lands review.

The environmental impact of unsuitability standards on a broad scale is discussed in the environmental impact statement prepared by the Department of the Interior's Office of Surface Mining Reclamation and Enforcement (OSM) in connection with its permanent program regulations [13,14]. Section 702 of SCMRA exempts the Federal Lands Program, including the Federal lands review required by Section 522, from compliance with the requirements of NEPA for preparation of an environmental impact statement. Since November 1977, the Department of the Interior has been developing unsuitability criteria for Federal lands. These are discussed in Chapters 3 and 5 and are presented in the proposed regulations (Appendix A). Although these standards are exempt from NEPA's environmental impact statement requirement, the effects of the proposed criteria are discussed in this statement.

Other features of SMCRA relevant to the development of a Federal coal management program are:

- Authority to exchange Federal lands already under lease but which have been included in an alluvial valley floor and are subject to the grandfather clause in Section 510(b)(5) of the Act.
- A requirement for the consent of certain private surface owners before the Department can lease any Federal coal under privately-owned land.

1.3.1.4 Mineral Leasing Act for Acquired Lands. The Mineral Leasing Act for Acquired Lands governs leasing on Federally-acquired lands for coal as well as other minerals covered by the Mineral Leasing Act. The Act requires the consent of the head of the Federal agency having administrative jurisdiction over the lands before BLM can lease For coal. The Federal Coal Leasing Amendments Act grants similar veto authority to the surface managing agency with regard to nonacquired lands. Otherwise, leasing provisions are the same as those for nonacquired lands.

1.3.1.5 Other Relevant Laws. Numerous other Federal laws regulate aspects of coal development and energy conversion. Most pertinent laws are summarized in Table 1-3.

1.3.2 Interagency Relationships in Federal Coal Management

The jurisdictional interrelationships in a Federal coal management program are complex. Many Federal departments and agencies are involved through their specific mandates or related authori-

TABLE 1-3

FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONVERSION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
Antiquities Act of 1906	59-209; 16 U.S.C. 431	•Regulates antiquities excavation and collection (including fossil remains).	•Mitigates potential harm to historical, archaeological, and paleontological resources.
		•Protects historical values on public land.	
Archaeological and Historical Preservation Act of 1974; Archaeological Salvage Act	93-291, 86-523; 16 U.S.C. 469	•Provides for recovery of data from areas to be affected by Federal actions.	•Mitigates potential harm to historical and archaeological, and paleontological resources.
		•Provides for preservation of data (including relics and specimens) at every Federal construction project.	•Mitigates potential harm to historical and archaeological resources.
Bald Eagle Protection Act of 1969, as amended	86-70; 16 U.S.C. 668	•Protects bald and golden eagles.	•May make certain coal lands off-limits for development.
Clean Air Act Amendments of 1977	95-95; 42 U.S.C. 7401	•Establishes requirements for areas failing to attain National Ambient Area Quality Standards (NAAQS). •Provides for prevention of significant deterioration of areas where air is cleaner than NAAQS. •May require a Federal permit where conflicts with coal development exist.	•Limits industrial development within and adjacent to areas exceeding NAAQS and areas preserving clean air quality. •Reduces commercial attractiveness of low-sulfur Western coal as new source standard changed to percent emissions reduction.

TABLE 1-3 (Continued)

FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONVERSION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
Clean Air Act Amendments of 1977 (Con't.)		•Modifies 1970 air act provisions regarding Federal facilities; enforcement strategies; coal utilization impacts; and interstate air pollution.	
Clean Water Act of 1977	95-217; 33 U.S.C. 1251	•Establishes effluent limitations for new and existing industrial discharges into U.S. waters. •Limitations set for public treatment discharges; with pretreatment by industrial users. •Provides mechanism to restore and maintain integrity of the nation's waters.	•May reduce development options in areas where anti-degradation policy restricts discharges into high quality waters. •Treatment facilities in areas with rapidly expanding infrastructures must meet water quality standards. •Effluent standards apply to coal mining point sources.
Endangered Species Act of 1973, as amended	93-205;16 U.S.C. 1531	•Protects endangered and threatened species and critical habitat from Federal activities. Requires prior consultation with Fish and Wildlife Service.	•May make certain coal lands unsuitable for development.
Fish and Wildlife Coordination Act of 1934	85-624; 16 U.S.C. 661	•Requires consultation about water resource development actions which might affect fish or associated wildlife resource.	•Mitigates potential Federal coal development impacts.

TABLE 1-3 (Continued)

FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONVERSION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
Historic Preservation Act of 1966	89-665; 16 U.S.C. 470 See also 94-429; 16 U.S.C. 1609	•Establishes system of classifying properties on or eligible for inclusion on Historic Register. •Mandates Federal agency consultation with Advisory Council and State historic preservation officers.	•Mitigates potential harm to historical and archaeological values.
National Environmental Policy Act of 1969	91-190; 42 U.S.C. 4321	•Makes environmental protection part of the mandate of every Federal agency. •Requires impact statements for major Federal actions with potentially significant impacts.	•Provides legislative authority to control energy development on environmental grounds. •Impact statement process must be integral part of coal leasing system.
Mining and Minerals Policy Act of 1970	91-631; 43 U.S.C. 21	•Declares Congressional Minerals Policy.	•Provides broad, general principles for mineral resource development.
Noise Control Act of 1972	92-574; 42 U.S.C. 4901	•Requires publication of information on limits of noise required to protect public health and welfare. •Preempts local control of railroad equipment and yard noise emissions.	•Regulations may be proposed to control coal mining areas and activities.
Resource Conservation and Recovery Act of 1976	94-580; 42 U.S.C. 6901	•Establishes guidelines for collection, transport, separation, recovery and disposal of solid waste.	•Mining locations may be affected by EPA regulations governing disposal of coal mining wastes.

TABLE 1-3 (Continued)

FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONVERSION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
Resource Conservation and Recovery Act of 1976 (Cont.)		•Creates major Federal hazardous waste regulatory program. •Provides assistance to establish state or regional solid waste plans.	•Coal industry faced with stringent permit requirements if coal wastes classified by EPA as hazardous.
Safe Drinking Water Act of 1977	95-190; 42 U.S.C. 300	•Establishes mechanism for National Primary Drinking Water Standards.	•EPA conducting study of the impacts of pits, ponds, lagoons, etc. on underground water supplies for public water systems.
Soil and Water Resources Conservation Act of 1977	95-192; 16 U.S.C. 2001	•Requires appraisal by Secretary of Agriculture of information and expertise on conservation and use of soils, plants, woodlands, etc.	•Provides opportunity for expanded data base.
Multiple-Use Sustained Yield Act of 1960	86-519; 16 U.S.C. 528	•Requires management of national forests under principles of multiple use so as to produce a sustained yield of products and services.	•Mandates land management principles similar to those required under FLPMA.
National Forests Management Act of 1976	95-233; 16 U.S.C. 472a	•Provides for a comprehensive system of land and resource management planning for National Forest System lands.	•Key factor in the Department of the Interior's determination of where coal leasing would occur.

TABLE 1-3 (concluded)

FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONVERSION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
Department of Energy Organization Act of 1977	95-91; 42 U.S.C. 7101	•Transfers authority to issue some coal regulations from DOI to DOE, including production regulations.	•Limits coal management authority exercised by the Department of the Interior.
		•DOE determines long-term national coal production goals.	•Requires program to establish proper coordination mechanisms.
Act of September 28, 1976	94-429; 16 U.S.C. 1908	•Provides for the regulation of mining activity within, and to repeal the application of mining laws to, areas of the National Park System, and for other purposes.	•Requires recognition and protection of nationally significant natural areas as they relate to surface mining.

ties. This section summarizes the major points of interaction both within and external to the Department of the Interior.

1.3.2.1 Department of Energy Coal-Related Functions. While many agencies across the Federal structure are involved in coal management activities, the Federal coal management program would be carried out principally by agencies in the Department of the Interior and the Department of Energy (DOE). The DOE was established in October 1977 following enactment of the Department of Energy Organization Act (DOE Act). The DOE Act was passed in response to the Nation's increasing shortage of nonrenewable energy resources and to the national security implications of increasing dependence on foreign energy supplies. Under the Act, many of the energy-related functions of a myriad of agencies were consolidated under a single departmental organization. It was envisioned that the reorganization would foster cooperation among Federal, state, and local governments in the development of national energy programs.

Prior to the passage of the DOE Act, the Department of the Interior had exclusive jurisdiction over Federal coal leasing decisions for public lands administered by the Department. However, the DOE Act transferred to the Department of Energy authority to promulgate regulations for:

- Fostering competition for Federal leases.
- Implementing alternative bidding systems for the award of Federal leases.
- Establishing diligence requirements for coal development operations on Federal leases.
- Setting rates of production for Federal leases.
- Specifying procedures, terms, and conditions for the acquisition and disposition of Federal royalty interests taken in kind.

Activities specified in the DOE Act for which the Secretary of the Interior will remain solely responsible are:

- Issuance and supervision of Federal leases.
- Enforcement of all regulations applicable to leasing of mineral resources, including but not limited to lease terms and conditions and production rates.
- Issuance of all other kinds of regulations.

The Department of the Interior is also required to provide DOE not less than 30 days in which to disapprove any newly proposed lease term or condition which relates to any matter upon which DOE has authority to promulgate regulations under the DOE Act. No such term or condition may be included in a lease if it is disapproved. Reasons for such disapproval and acceptable alternatives must be furnished in writing to the Department by DOE.

The DOE is required to consider and establish energy production, use, and conservation goals, for periods of 5, 10, and 15 years, necessary to satisfy projected energy needs of the United States. These goals are considered as objectives for the national production of energy resources which are necessary to carry out national energy policy. These production goals are to be included in the proposed National Energy Plan (which is to be transmitted to the Congress no later than April 1, 1979) and are to be reviewed biennially. Section 802 of the Act provides procedures for the Congress to enact legislation regarding the National Energy Plan which may contain appropriate alternatives to, modifications of, or additions to the proposed Plan submitted by the President. Department of Energy and Department of the Interior production goal setting procedures for national energy resources, including coal, from Federal lands between the two Departments have been established in a September 1978 Memorandum of Understanding signed by the two Secretaries. This Memorandum is included in Appendix B.

The Office of Leasing Policy Development manages DOE's responsibilities for participating in Federal energy leasing programs. This office has the responsibility for drafting regulations to implement DOE's leasing responsibilities addressed in the prior section and for fostering close coordination with the Department of the Interior and other agencies.

The Department of Energy's Office of Coal Supply Development was established to monitor, from a broad viewpoint, restraints on coal supply. The office has no direct mandate in coal leasing, but has been reviewing coal supply as a system. Its aim is to isolate potential constraints and attempt to ameliorate them by alerting appropriate policy offices and by drafting corrective legislation. Some subjects currently under study by the office include: the effect of SMCRA on coal production; transportation problems (rising rates, equipment shortages); manpower demand in the mines; coal

leasing (or lack of it) as a potential constraint for competition; and constraints in supply from growing production costs.

1.3.2.2 DOE-Interior Leasing Liaison. A Leasing Liaison Committee was authorized by the DOE Organization Act. This committee has been established and now serves as an executive level coordinating mechanism on Federal energy leasing and other interagency energy programs. Both DOE and Interior are represented by four policy level representatives on the Committee. The Committee meets quarterly and has been used to discuss major policy-level concerns of the two agencies.

1.3.2.3 Department of the Interior's Coal Management Functions. The division of the Department of the Interior's functions and responsibilities concerning management of Federal coal between the the Office of Surface Mining Reclamation and Enforcement (OSM), the Geological Survey (USGS), and BLM was set forth in a memorandum signed by the Assistant Secretary, Land and Water Resources, and the Assistant Secretary, Energy and Minerals, in July 1978. Table 1-4 presents the three agencies' extensive coal management responsibilities. The table is divided into three sections—Pre-leasing Functions, Post-leasing Pre-mining Functions, and Functions and Responsibilities During Mining Operations. It indicates the prime responsibility, joint responsibility, consulting, and concurrence requirements of the departmental agreement.

Regulation of coal development on Federal leases is shared by the OSM and the USGS. OSM administers the Department's program to mitigate the adverse effects of surface coal mining and to reclaim land which has been adversely affected. OSM's jurisdiction extends to the surface effects of underground coal mining operations.

SMCRA, OSM's enabling statute, establishes a two-tiered program for the regulation of surface coal mining and the surface effects of underground coal mining on both private and Federal lands. The first phase of this regulatory program went into effect on private lands on December 13, 1977, upon publication of OSM's interim program regulations (30 CFR Part 700, Subchapter B)[15]. These regulations, among other things, put into effect those of the statute's environmental performance standards which the Congress considered to be sufficiently critical to require almost immediate implementation. Examples of these standards are the requirement to return previously mined land to approximate original contours, to segregate topsoil, and to minimize the disturbance to the hydrological balance of both the mine site and associated off-site areas. These interim performance standards, as well as OSM's inspection and enforcement program, were applied to Federal lands on September 21, 1978, upon publication by the USGS of revisions to its coal mining operating regulations (30 CFR Part 211)[16].

Regulations governing OSM's permanent regulatory program were published in the Federal Register on March 13, 1979, 44 Federal Register 14902-15463 (1979). The permanent regulatory program implements the statute's remaining environmental performance standards, as well as permit application requirements, bonding provisions and provisions for the designation of lands unsuitable for mining on Federal lands.

The USGS determines reserves present on Federal lease tracts, develops coal resource economic evaluations for lease tracts (recommendations for bonus bids and royalty rates), and prepares development and mineral resource recovery requirements for Federal leases. Under its Part 211 regulations, the USGS oversees coal exploration operations, reviews mine plans, and inspects mining operations for compliance with its resource, conservation, development, and recovery requirements. The USGS is currently revising its Part 211 regulations to be consistent with OSM's permanent Federal lands regulations.

In those instances where a mining operation occurs on Federal lands in a state which has concluded a cooperative agreement with the Department under Section 523 of SMCRA, regulatory responsibility for Federal coal development, with respect to reclamation requirements, may be shared with that state. Both SMCRA and the Mineral Leasing Act of 1920, as amended, prohibit the Secretary's delegating to the states his responsibility for protection of the Federal government's proprietary interest in the development of coal resources on Federal lands. Under these cooperative agreements, the states may review and approve mining plans concurrently with the Federal review of those plans and inspect mining operations on Federal lands. To date, the Secretary has concluded and formally proposed cooperative agreements with the States of Utah, Wyoming, and Montana.

TABLE 1-4

DEPARTMENT OF THE INTERIOR

DIVISION OF FUNCTIONS AND RESPONSIBILITIES CONCERNING MANAGEMENT OF FEDERAL COAL
BETWEEN THE OFFICE OF SURFACE MINING, THE U.S. GEOLOGICAL SURVEY AND THE BUREAU OF LAND MANAGEMENT (OSM, USGS, AND BLM)

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTATION WITH	CONCURRENCE FROM
PRE-LEASING FUNCTIONS				
Evaluate coal resources	USGS	---	---	---
Petition process for designation of Federal lands unsuitable for all or certain types of surface coal mining operations	OSM - Receives petitions - Conducts hearings - Issues decisions	Surface Management Agency and other appropriate State and local agencies	---	---
Federal coal lands review	BLM - applies criteria in determination of suitability	---	OSM, USGS & other surface managing agencies	OSM - establishes ground rules and criteria for Federal coal lands review
Preparation of regional EIS or site-specific pre-lease EIS concerning lease tract selection	BLM lead agency (unless other agency designated lead agency) - Relating to lease tract selection	---	OSM, USGS & other appropriate agencies and state and local interests	---
Preparation, special lease terms and conditions	BLM	---	OSM (responsibilities under SMCRA - to administer protection requirements of the act), USGS (responsibilities under the MLA	USGS, OSM, and DOE
Act as Secretary's official representative in dealing with lease applicants	BLM	---	---	---
Surface owner consent	BLM (lease tract selection function)	---	---	---

TABLE 1-4 (Continued)

DEPARTMENT OF THE INTERIOR

DIVISION OF FUNCTIONS AND RESPONSIBILITIES CONCERNING MANAGEMENT OF FEDERAL COAL
BETWEEN THE OFFICE OF SURFACE MINING, THE U.S. GEOLOGICAL SURVEY AND THE BUREAU OF LAND MANAGEMENT (OSM, USGS AND BLM)

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTATION WITH	CONCURRENCE FROM
POST-LEASING PRE-MINING FUNCTIONS				
Prepare recommendations on applications for use of Federally owned surface over leased coal for rights not granted in Federal coal lease	BLM	OSM & USGS (BLM receives applications) - prior to receipt of coal mining plan it is solely USGS responsibility to report on surface use application	USGS before mining plan; OSM after mining plan filed.	---
Delineation of "permit area"	None until mining plan filed. Then OSM assumes responsibility with concurrence of BLM and USGS	---	---	BLM and USGS
Review, approval of mining plans and major modifications; lead agency for preparation of site specific EA/EIS and coordination with other agencies outside DOI	OSM has lead responsibility (formerly assigned to USGS, became essential function of OSM under Sec. 201, SMCRA)	BLM and USGS	BLM regarding special requirements relating to protection of natural resources; USGS regarding responsibilities relating to development, production and resource recovery requirements	USGS on production and recovery requirements
Exploration on leased coal lands outside a permit area	USGS receives application and and supervises operations for all exploration outside a permit area	---	OSM	---
Exploration on leased coal lands within a permit area	OSM	OSM and USGS coordinate a a data exchange	USGS	USGS
Responsibility for all non-lessee activity on lease land prior to operations	BLM	---	---	---
Responsibility for determining performance bond	OSM (BLM for interim period)	---	---	---

TABLE 1-4 (Continued)

DEPARTMENT OF THE INTERIOR

DIVISION OF FUNCTIONS AND RESPONSIBILITIES CONCERNING MANAGEMENT OF FEDERAL COAL
BETWEEN THE OFFICE OF SURFACE MINING, THE U.S. GEOLOGICAL SURVEY AND THE BUREAU OF LAND MANAGEMENT (OSM, USGS AND BLM)

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTATION WITH	CONCURRENCE FROM
FUNCTIONS AND RESPONSIBILITIES DURING MINING OPERATIONS				
Act as Secretary's representative in dealing with lessees and/or operators during operations	OSM (formerly USGS & BLM)	USGS retains production functions; OSM assumes environmental and enforcement functions; BLM retains non-mining functions, outside the permit area, including rights-of-way and ancillary activities related to mining. USGS & BLM inspection in connection with USGS, BLM functions, are coordinated with OSM inspections (except BLM inspections otuside the permit area). USGS makes royalty audits and other nonfield inspections independent of OSM.	---	---
Take necessary action in emergency environmental situation	OSM (formerly USGS & BLM)	OSM has primary emergency authority; BLM & USGS have such authority when OSM inspectors are unable to take action before significant harm or damage will occur. USGS & BLM retain their present procedures for emergencies involving loss, waste, or damage to coal and other natural resources and to other MLA functions	---	---
Conduct inspection prior to abandonment and specify and approve abandonment procedures	OSM (primary authority to approve abandonment procedures and approve abandonment of operations)	OSM, USGS, BLM - all have abandonment inspection responsibility	Private surface owner in case of private surface.	BLM concurrence in approval of compliance, special requirements: protection of natural resources & post-mining land use of affected lands. USGS concurrence: compliance with production and coal resource recovery requirements.

TABLE 1-4 (Conclusion)

DEPARTMENT OF THE INTERIOR

DIVISION OF FUNCTIONS AND RESPONSIBILITIES CONCERNING MANAGEMENT OF FEDERAL COAL
BETWEEN THE OFFICE OF SURFACE MINING, THE U.S. GEOLOGICAL SURVEY AND THE BUREAU OF LAND MANAGEMENT (OSM, USGS AND BLM)

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTATION WITH	CONCURRENCE WITH
Release of reclamation bond (permanent program)	OSM	---	---	BLM & USGS concurrence.
Release of lease bond	BLM	---	---	BLM & USGS concurrence.

NOTE: These agencies will also consult with the U.S. Fish and Wildlife Service, both on a general basis such as during land-use planning and on a specific basis when required by laws such as The Endangered Species Act.

Negotiations are in progress with the States of New Mexico, Colorado, and North Dakota. If these latter three states are unable to conclude successful negotiations with the Department to modify their cooperative agreements, their existing agreements will terminate.

The BLM has the principal responsibility for carrying out the requirements of FCLAA. It prepares the required land use plans and does land use analyses where Federal interests are not sufficient to justify a land-use plan. It has the responsibility to delineate, rank, and select lease tracts and to consult with surface owners over Federal coal. The BLM also conducts hearings on leasing proposals and prepares the necessary environmental analyses. It also carries out certain functions under SMCRA including the initial review of Federal lands to determine which lands are unsuitable for all or certain types of coal mining.

The Department's Office of Coal Leasing, Planning and Coordination serves as the focal point for developing and carrying out the Department's coal policy review and the development of a program for the management and leasing of Federally-owned coal resources in accordance with the President's directives in the National Energy Plan and Environmental Message (see Section 1.4.1). The Office is responsible for developing and coordinating Departmental policies affecting Federal coal management. It assists the Secretary, through the Assistant Secretary for Land and Water Resources, in implementing the Federal coal management responsibilities vested in the Department under the Mineral Leasing Act of 1920 and the Federal Coal Leasing Amendments Act of 1976.

Other Interior Department agencies with lesser coal related responsibilities are the U.S. Fish and Wildlife Service, Bureau of Mines, Bureau of Reclamation, and Heritage Conservation and Recreation Service. The U.S. Fish and Wildlife Service conducts surface mining studies and monitoring work relating to impacts on wildlife in general and on endangered species in particular. These studies are used to assess and predict the affects of coal-related activities on fish, wildlife, and their habitats on Federal, state, and private lands. For particular requirements on Endangered Species Act consultation, see 50 CFR Part 402, 43 Federal Register 870. The division of wildlife related responsibilities in coal management between the U.S. Fish and Wildlife Service and the Bureau of Land Management was established in a Memorandum of Understanding signed on September 26, 1978, and is included in Appendix B.

Coal activities in the U.S. Bureau of Mines include conducting advanced coal mine health and safety research and demonstration projects on backfilling and subsidence.

1.3.2.4 Other Federal Agencies with Coal Related Responsibilities. Table 1-5 summarizes relevant coal management functions within the Federal structure. Policy and evaluation functions relating to coal, not previously addressed, are assigned within the Executive Office of the President to the Office of Management and Budget, the Council of Environmental Quality, the Domestic Policy Staff, the National Security Council, and the Office of Science and Technology Policy.

The Forest Service in the Department of Agriculture has been given added responsibility relating to coal management functions through the FCLAA. Under the Act, the Secretary of Agriculture has consent authority for Federal leases under his jurisdiction, and may add terms and conditions to coal leases on these lands to protect resource and environmental values. This authority extends to approval of mining and reclamation plans for Federal leases on National Forest System lands.

New responsibilities have also been given to a second Agriculture Department agency, the Soil Conservation Service, including assisting in the identification of prime farmlands within areas that may be surface mined in the future and reviewing and commenting on permits for surface mining which involve prime farmland. The Service is also authorized to review and comment on state reclamation plans.

The FCLAA strengthened the Justice Department's role in preventing anticompetitive and monopolistic practices related to Federal coal leasing. FCLAA requires the Interior Department to consult Justice during rulemaking. It also requires the Justice Department to review whether the issuance, renewal, or readjustment of a coal lease would tend to create a situation inconsistant with the antitrust laws, and limits the Interior Department's authority to issue a coal lease once that finding has been made. Justice is also required

TABLE 1-5

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES AFFECTING THE PRODUCTION, TRANSFORMATION AND UTILIZATION OF COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATION UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
1. Energy Department (including functions relating to coal from ERDA, FEA and FPC; and some from Interior)	Ass't Secretary, Energy Technology	Fossil Energy Program Office	Coal mining technology development Coal utilization R&D (e.g., gasification; liquefaction) Coal cleaning technology
	Ass't Secretary, Resource Application	Fossil Energy Division	Coal utilization technology demonstrations Leasing of publicly-owned coal lands (with Interior) Forced use of coal by utilities and industry through regulation Coal loan guarantee program Section 302 of DOE Organization Act
	Ass't Secretary, Environment	Biomedical and Environmental Research Division Control Technology Division Division of Policy Analysis Division of NEPA Affairs Division of Operational Safety Division of Technology Assessment Division of Environmental Impact	Biomedical and environmental effects research Environmental control technology NEPA compliance Evaluates policy conflicts
	Administrator, Energy Regulatory Administration	Energy Regulatory Administration	Regulation, conversion to coal and use of coal Regulation of gas from coal
	Administrator, Energy Information Administration	Energy Information Administration	Data collection and analysis relating to coal
	Director, Energy Research		Coordinates all energy research, presumably including coal Grants for University Coal Research Laboratories (title VIII of H.R. 2)

TABLE 1-5 (Continued)

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES
AFFECTING THE PRODUCTION, TRANSPORTATION AND UTILIZATION OF COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATION UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
2. Interior Department	Ass't Secretary, Energy and Minerals	Bureau of Mines	Developing mining technology Mine reclamation demonstrations Coal mine health and safety R&D Technology for cleaning coal
		Geological Survey	Coal resource investigations Coal hydrology investigations Classification of publicly-owned lands Regulation of operations on leased coal lands Environmental studies related to coal
		Office of Surface Mining	Regulate surface mining Regulating surface effects of underground mining Assistance to states for mining and reclamation programs Assistance for state mining and mineral search institutes Reclamation of abandoned mined areas Develop mining technology, production, environment, health and safety
	Ass't Secretary, Land and Water	Bureau of Land Management	Leasing and operations--publicly-owned coal lands (with DOE) Environmental studies relating to coal
		Office of Coal Leasing, Planning and Coordination	Policy and program development responsibility
		Bureau of Reclamation	Water project studies Water availability
	Ass't Secretary, Fish and Wildlife and Parks	U.S. Fish and Wildlife Service	Surface mining studies relating to wildlife

TABLE 1-5 (Continued)

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES
AFFECTING THE PRODUCTION, TRANSPORTATION AND UTILIZATION OF COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATION UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
3. Agriculture Department	Ass't Secretary, Conservation, Research and Education	Forest Service	Land and resource management planning necessary for the administration of National Forest System lands and the management of renewable natural resources. The development of lease stipulations and the exercise of consent authority in lease issuance and mining and reclamation plan approval. The issuance of easements and permits for ancillary facilities off the lease area The administration of an abandoned mined land reclamation program
		Soil Conservation Service	Technical assistance on conservation planning, soil surveys, plant materials, river basis surveys, and hydrological studies
		Science and Education Administration	Mined land reclamation research
	Ass't Secretary, Rural Development	Rural Electrification Administration	Loans and loan guarantees for electrical generating, transmission and distribution systems
4. Labor Department	Ass't Secretary, Mine Safety and Health	Mine Safety and Health Administration*	Regulation of coal mine safety and health
	Ass't Secretary, Employment	Office of Worker' Compensation	Pneumocniosis benefits
5. Transportation Department		Federal Railroad Administration	Railroad assistance programs, including revitalization, important to coal transportation
6. Commerce Department	Ass't Secretary for Economic Development	Economic Development Administration	Assistance for planning for socioeconomic planning for energy development

*Formerly Mining Enforcement and Safety Administration (MESA)

TABLE 1-5 (Continued)

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES AFFECTING THE PRODUCTION, TRANSPORTATION AND UTILIZATION COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATION UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
7. Health, Education and Welfare Department	Ass't Secretary for Health	National Cancer Institute	Biomedical effects research
		National Institute for Environmental Health Sciences	Biomedical and environmental effects relating to coal
		National Institute for Occupational Safety and Health	Biomedical and environmental effects research (e.g., coal workers occupational diseases)
8. Environmental Protection Agency (EPA)	Ass't Administrator Air and Waste Management	Office of Air Quality Planning and Standards	Air quality standards and regulations
	Ass't Administrator, Water and Hazardous Materials	Office of Water Planning and Standards	Water quality standards and regulations
	Ass't Administrator, Enforcement	Office of General Enforcement Office of Water Enforcement	Enforcement of EPA standards and regulations
	Ass't Administrator, Research and Development	Office of Health and Ecological Effects	Biomedical and environmental effects research
		Office of Energy, Minerals and Industry	Environmental control technology development Coal utilization R&D Coal cleaning technology
9. Corps of Engineers	(Reports to Secretary of the Army)	Civil Works	Waterways projects important to coal transportation Regulation relating to standards and criteria on design, location, construction, maintenance, enlargement, modification, removal and abandonment of new and existing coal mine waste piles
10. Interstate Commerce Commission			Regulations of railroads
11. Tennessee Valley Authority (TVA)			Coal technology R&D (ammonia from coal) of activities (technology, economic assistance, etc.) Purchases and uses large amounts of coal

TABLE 1-5 (Continued)

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES
AFFECTING THE PRODUCTION, TRANSPORTATION AND UTILIZATION OF COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATIONAL UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
12. Treasury Department			Tax policy and collection
13. Justice Department			Litigation involving public lands
14. Housing and Urban Development			Housing and development of new communities
15. Community Services Administration			Assistance to solve economic problems in communities
16. Small Business Administration			Small business loans for coal-related facilities, machinery, equipment
17. National Science Foundation			
	Other Independent Commissions		
18. Federal Trade Commission			Promotes fair competition; prevents restraint of trade, and price fixing
19. Securities and Exchange Commission			Regulates public utility holding company systems; reviews mining disclosures
20. Federal Energy Regulatory Commission			Has regulatory authority over gasification in interstate sales of power; establishes and enforces rates and charges for electric energy transmission and sale

And also various water resources and regional agencies and commissions:
Water Resources Council, Susquehanna River Basin Commission, Delaware River Basin Commission, Missouri River Basin Commission, Regional Action Planning Commissions: Coastal Plains, Four Corners, Old West, Appalachian Regional Commission, Ozarks and Upper Great Lakes Regions, involved with coal and mining planning water resources, environmental and economic impacts, regional developments.

TABLE 1-5 (Concluded)

PRINCIPAL DEPARTMENTS AND AGENCIES INVOLVED IN ACTIVITIES
AFFECTING THE PRODUCTION, TRANSPORTATION AND UTILIZATION OF COAL

DEPARTMENT OR AGENCY	ASSISTANT SECRETARY OR ASSISTANT ADMINISTRATOR	MAJOR ORGANIZATION UNIT WITHIN THE DEPARTMENT OR AGENCY (BUREAU, ETC.)	PROGRAM OR FUNCTION
Activities of organizations and agencies within the Executive Office of the President such as: The Office of Management and Budget (OMB) The Domestic Policy Staff Council on Environmental Quality (CEQ) Office of Science and Technology Policy (OSTP)			
Activities of the Departments of Treasury (e.g., tax policy and collections, proposed tax rebates for coal utilization facilities) and Justice (e.g., litigation involving public lands)			
Activities of Ass't Secretaries and Administrators having major activities relating to coal but no in line program activities; e.g., those concerned with policy analysis, planning, management, budgeting, general counsel			
Activities of numerous additional agencies or elements of agencies that participate in or comment upon Environmental Impact Statements prepared by the organizations listed on the chart above			
Energy related basic research activities, such as that of the Energy Department, National Science Foundation, and Bureau of Standards (Commerce Department)			
Agencies purchasing coal for their use, such as TVA and Department of Defense			
Activities -- usually studies -- of the agencies of the Legislative Branch: Library of Congress Office of Technology Assessment (OTA) General Accounting Office (GAO) Congressional Budget Office (CBO)			

Source: Developed from descriptions of various agency programs.

to report to Congress annually on competition in the coal industry.

Legislative organizations with coal management involvement are:

- Library of Congress, Congressional Research Service.
- General Accounting Office.
- Congressional Budget Office.
- Office of Technology Assessment.

These organizations provide research, monitoring, and oversight capabilities for the Congress.

1.4 EXISTING FEDERAL ENERGY POLICIES

1.4.1 Role of Coal in National Energy Policy

In April 1977, President Carter released the Administration's National Energy Plan (NEP), which combines legislative, administrative, and budgetary proposals aimed at solving the Nation's energy crisis. The following seven energy goals for 1985 were announced:

- Reduce total energy growth to below two percent a year.
- Reduce oil imports below six million barrels a day.
- Reduce gasoline consumption by 10 percent from 1977 levels.
- Increase annual coal production by at least 400 million tons over 1976 levels.
- Insulate 90 percent of all buildings.
- Use solar energy in 2.5 million homes.
- Acquire a strategic oil reserve of one billion barrels of oil.

An important element of the NEP is the belief that coal must be the fuel which makes possible a reduction in the U.S. economy's energy related uses of oil and gas. The NEP sets goals for replacing oil and gas with coal and other energy alternatives. Meeting those goals will require increases in the production of coal, with the predicted added production ranging from 400 million more tons per year to 600 million more tons per year, or a possible doubling of 1977 annual production by 1985.

The President also stressed that projected increases in coal production can and must take place without increasing the damage caused by traditional coal mining and consumption practices. In his Environmental Message of May 23, 1977, the President said:

> "The newly enacted Coal Leasing Amendments and the Federal Land Policy and Management Act provide the Secretary of the Interior with the necessary authority to carry out environmentally sound, comprehensive planning for the public lands. His duty now is to implement an affirmative program for managing coal lands and associated resources in a manner that fully protects the public interest and respects the rights of private surface owners" [18].

Following this message, the President, by memorandum of May 24, 1977, instructed the Secretary of the Interior to "manage the coal leasing program to assure that it can respond to reasonable production goals by leasing only those areas where mining is environmentally acceptable and compatible with other land uses."

The President further directed that the Department "scrutinize existing Federal coal leases (and applications for preference right leases) to determine whether they show prospects for timely development in an environmentally acceptable manner, taking steps as necessary to deal with nonproducing and environmentally unsatisfactory leases and applications." The memorandum also contained the instruction to review the basis for granting or denying preference right leases and to propose legislation authorizing the Department to condemn outstanding leases upon payment of reasonable compensation, if necessary, to prevent unacceptable environmental damage. Implementation of these Presidential directives are addressed in subsequent chapters of this statement, particularly in Chapter 3.

1.4.2 Congressional Action

Prior Congressional action on legislative proposals directly related to coal management was addressed previously (see Section 1.3). Last year, the Congress focused on the President's proposed National Energy Act.

The National Energy Act was submitted to Congress on April 29, 1977, in response to the President's April 20, 1977, message to a joint session of Congress. The Act was then divided into five major legislative initiatives to correspond to the jurisdictions of appropriate standing committees. On October 15, 1978, Congress passed five bills:

- The National Energy Conservation Policy Act.

- The Public Utilities Regulatory Policy Act of 1978.
- The Natural Gas Policy Act of 1978.
- The Energy Tax Act of 1978.
- The Power Plant and Industrial Fuel Use Act of 1978.

Summaries of these Acts, as passed by Congress and signed by the President follow.

Conservation. The National Energy Conservation Policy Act contains incentives to reduce residential energy use. The Act provide grants for weatherizing lower income homes and a $900 million three-year grants program to states to improve the energy efficiency of schools, hospitals, and municipal buildings. Grants and government-backed loans are made available for low-income families. The Act also establishes mandatory efficiency standards for 13 major home appliances including water heaters and furnaces. These are to take effect in the mid-1980's. Finally, the Act establishes a program requiring utilities to inform their customers of suggested energy conservation and solar energy measures and to give loans to consumers to install conservation equipment. These measures could indirectly affect coal use by potentially reducing electrical demand from utilities.

Utility Rate Reform. The Public Utility Regulatory Policies Act of 1978 establishes several rate making standards to guide electric utility rate setting policies and practices. To the maximum extent practicable, rates charged by any electric utility should reflect the costs of providing that electric service and encourage conservation through time-of-day rates, seasonal rates, cost of service pricing, interruptible rates, lifeline rates, and prohibition of declining block rates. State regulatory authorities and utilities would be required to formally consider standards within prescribed periods. The Act also requires the Federal Energy Regulatory Commission to prescribe rules favoring industrial cogeneration facilities.

Coal use could be affected by the Act through a leveling of electrical demand, thereby reducing the number and capacity of generating plants needed to supply peaking power.

Natural Gas. The Natural Gas Policy Act of 1978 is particularly significant in that it settles a 39-year confrontation between natural gas producers and consumers over the question of natural gas price controls. It provides continued controls through 1985 with appropriate safeguards beyond that period. The controlled, but escalating, price will substantially increase the incentives for new gas production. Most importantly, the Act will: (1) create a single national market for natural gas production; (2) increase production; and (3) increase producer revenues because of the ability of all producers to help satisfy the demand for natural gas in the interstate market. The one to two trillion cubic feet per year of extra gas that would flow into the interstate market would replace up to one million barrels per day of foreign oil imports.

Coal Conversion. The Powerplant and Industrial Fuel Use Act (FUA) of 1978 prohibits the use of petroleum and natural gas by certain electric powerplants and industrial major fuel burning installations. Effective May 8, 1979, FUA would require the use of coal, synthetic gas derived from coal, or alternate fuels other than oil or natural gas in new utility generation facilities or new industrial boilers, gas turbines, and internal combustion and combined cycle units with a capacity greater than 10 megawatts. For existing powerplants and industrial facilities, DOE can require conversion to coal, other fuels, or coal-oil mixtures.

As with the Department's preferred program, FUA contributes an element to the NEP which advances the use of coal over oil and natural gas. The NEP requirement to increase usage of abundant domestic energy sources is addressed in a November 1978 FUA draft programmatic environmental impact statement prepared by the DOE. The DOE statement evaluates the national impact of the Act based on the assumption that coal will be the primary fuel substituted for oil and gas until 1990. The level of coal production is based on the assumption that no economic exemption would be granted under the Act unless coal is 44 percent more costly than the use of imported oil. Base-case coal production estimates for 1985 and 1990 are indicated by DOE to be 1,098 and 1,255 million tons per year, respectively. These production estimates serve as the basis for the impact quantifications of the DOE statement. Coal consumption attributable to FUA implementation should be only seven percent (72 million tons) of

the total demand in 1985 and over 10 percent (129 million tons) in 1990, according to the statement.

Regional coal production estimates for 1985 and 1990 differ slightly from those used in the Department's preferred program and DOE leasing alternative; however, they are within the high-low estimate range used as the Department's analytical basis. The most obvious reason for the differences is that DOE's coal regions differ somewhat from those in this final environmental impact statement.

The FUA is expected to affect industries which consume large amounts of oil and gas in large boilers, such as food processing, paper and pulps, chemicals, refineries, and machinery. Utilities should be affected less, since new baseload facilities using fuels other than oil or gas are generally anticipated.

According to the FUA draft programmatic ES, the Act will have a major impact in Texas, Louisiana, Arkansas, Oklahoma, and New Mexico, which area accounts for 58 percent of the projected increased coal use in 1985 and 68 percent in 1990. Specific regional environmental impacts as evaluated in the draft programmatic environmental impact statement for the FUA are as follows:

- Air Quality - "negligible impact" from transportation due to the FUA through 1990; "little or no deterioration" in the Northern Great Plains states, northern New England, and Central Appalachia; and "no regional air degradation" from storage and onsite processing of coal".
- Weather and Climate - ". . . not expected to affect the climatic process . . . "
- Water Resource Quality - With some exceptions, "Generally, the FUA will not greatly accelerate mining in areas where acid drainage is a major problem"; ". . . FUA will contribute incrementally to acid precipitation in the eastern United States."; "Acid precipitation is expected to be minimal in the East Texas Gulf area. . . "; and "minimal" increase in mobilization of trace elements.
- Land Use - 328,000 acres of mostly rangeland, cropland, and some forest land may be disturbed by mining by 2020 as a result of the FUA. Assuming total disposal of ash and sludge by landfill, an additional 108,000 acres would be required for waste disposal; "minimal" land use impacts expected from FUA-generated transportation, storage, processing, and combustion.
- Terrestrial Biota - Major impact in Texas, Arkansas, Oklahoma, Kansas, Missouri, and Iowa due to loss of deciduous forest/grassland habitats, "increased combustion, emissions due to the FUA are not expected to be large enough to pose a major threat to terrestrial biota."
- Aquatic Biota - ". . . the FUA may create local impacts. . . resulting from hydrologic alterations, sedimentation, acid mine drainage, alkaline drainage, nutrient enrichment, acid precipitation, and trace metal precipitation."
- Endangered Species "Increased demand for coal under the FUA can . . . increase the potential for deleterious impact upon endangered species and their habitats."
- Social and Economic Impacts - Greatest impacts expected in the Northern Great Plains (25 percent coal production increase due to the FUA); 41 percent coal production increase in Texas.
- Health Effects - 82 fatal and 2500 nonfatal injuries in 1990 expected from increased coal use due to FUA.

Although the FUA draft environmental impact statement and this final environmental impact statement differ in scope and methodology, they are compatible. Both statements address aspects of the NEP which are consistent with increased importance of coal as a domestic energy source. Both statements are based on independently derived regional production estimates which are within close approximation of each other. Moreover, neither program (or environmental impact statement) conflicts with the other because they are directed at distinct and independent phases of the coal cycle.

1.5 STATE POLICIES AND CONSTRAINTS

State policies and legislative actions could act as constraints to development of coal resources in the western coal regions. This section considers the principal potential constraints embodied in the laws and permitting requirements of Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming. No attempt has been made to compile a a comprehensive listing of those laws or permits.

Rather, the purpose has been to indicate the principal constraints to coal development in State legislation. Table 1-6 lists some of these laws and presents a brief statement of their purpose and the state office or agency responsible for their administration and enforcement.

As can be seen from Table 1-6, potential legislative constraints to coal development are quite similar among the six states. Two of the states–Montana and New Mexico – have passed umbrella-type legislation similar to the National Environmental Policy Act (NEPA) of 1969. These laws establish state agencies to serve as general policy-making agencies of the state government. With or without these oversight agencies, however, all six states have developed legislation and established agencies to administer and enforce the legislation in key areas of environmental protection such as air, water, and solid waste management.

In many cases, the standards set at the state level have requirements more stringent than, or in addition to, the corresponding Federal standards. For example, the Wyoming ambient air quality standards are identical to the most stringent national standards except for the annual and 24-hour sulfur dioxide standards. (Wyoming's 60 microgram per cubic meter ($\mu g/m^3$) annual and 260 $\mu g/m^3$ 24-hour standards are more stringent than the 80 $\mu g/m^3$ annual and 365 $\mu g/m^3$ 24-hour National Ambient Air Quality Standards.) Also in the area of air quality, New Mexico has added standards for hydrogen sulfide, total reduced sulfur, and suspended particulate trace elements (beryllium, asbestos, and combined total of heavy metals).

State responsibility for enforcement of these environmental standards is considerable. This responsibility is derived either directly from state enabling legislation or indirectly through Federally-authorized transfers of enforcement responsibility as provided by applicable Federal law. For example, Section 107(a) of the Clean Air Act states that, "Each State shall have the primary responsibility for assuring air quality within the entire geographic area comprising such State by submitting an implementation plan for such State which will specify the manner in which the national primary and secondary ambient air quality standards will be achieved and maintained within each air quality control region in such State."

More specifically applicable to coal development, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) states in Section 523(c), "Any State with an approved State program may elect to enter into a cooperative agreement with the Secretary of the Interior to provide for State regulation of surface coal mining and reclamation operations on Federal lands within the State, provided the Secretary determines in writing that such State has the necessary personnel and funding to fully implement such a cooperative agreement in accordance with the provision of the Act." A listing of other relevant Federal legislation is contained in Table 1-3.

Other areas of concern that resulted in Federal legislation have also been addressed by complementary laws enacted by the western coal states. The states have passed antiquities or historic preservation laws to protect paleontological, archaeological, or historic resources within their boundaries. All of the states have adopted a provision that no mining plans or rights-of-way will be approved until the Bureau of Land Management has coordinated professional surveys of cultural resources (including archaeological, architectural, and historical remains) with the appropriate State Historic Preservation Officer and the Advisory Council on Historic Preservation and received their written review and comments.

All of the states have expressed concern over the protection of wildlife and wildlife habitat. In some states, this concern is demonstrated in the legislative approach to reclamation plans. In other states, such as New Mexico (under State Regulation 563), the State Game Commission is specifically authorized to be responsible for endangered species and sub-species in that State.

None of the state legislative measures mentioned thus far represent definite constraints to increased development of western coal resources. Rather, they can be interpreted more as extensions of Federal legislation. Given the high probability of increasing coal development activities throughout the coal regions of the United States in the near future, it is unlikely that state governments will attempt to block this activity unless the quality of the environment or the health and safety of their populations are in clear danger. Although some states have adopted somewhat more stringent environmental standards, a spirit of cooperation is apparent throughout state and Federal legislation.

TABLE 1-6 -- STATE LEGISLATION

COLORADO

Lead State Agency	Legislation	Purpose or Relevance
Colorado Department of Health --Water Quality Control Commission	Colorado Water Quality Control Act	Establishes and administers water quality standards in State waters. Requires site review and permit issuance for projects involving water, sewage, and waste disposal. Establishes criteria for erosion control dams.
--Air Pollution Control Commission	Colorado Air Pollution Control Act	Establishes and administers air quality standards. Would require mines to employ dust preventive measures to all mining procedures including construction activities.
State Land Use Commission	House Bill 1041 Colorado Land Use Act of 1974	Provides for the protection of the utility, value, and future of all lands within the State, including the public domain as well as privately owned land. Local governments have the duty to identify, designate, and administer such areas and activities of State interest, including mineral resource areas and mining activities.
	Colorado Antiquities Act of 1973	House Bill 1041 also establishes areas containing or having significant impact upon historical, natural, or archaeological resources as being of state interest. BLM must coordinate with State Historic Preservation Officer before approving mining plans or rights-of-way.

TABLE 1-6 (Continued)

COLORADO (Continued)

Lead State Agency	Legislation	Purpose or Relevance
Colorado Public Utilities Commission and State Highway Department		Concerned with construction of utility lines, highways and railroad lines, especially where crossing of public roads by a railroad is concerned.
Colorado Department of Natural Resources Division of Mines		Requires the filing of a Notice of Activity for any proposed mining exploration.
	Mining Employees Safety Act	Minitors mine safety practices.
-- Land Reclamation Board	Colorado Open Mining Land Reclamation Act of 1973	Provides for the reclamation of land subjected to surface disturbance by open mining and thereby conserve natural resources, protect wildlife and aquatic resources, and establish recreational, home and industrial sites to protect and perpetuate the taxable value of property.
Division of Labor		Issues permits to acquire, transport, and store explosives and other hazardous materials used in connection with construction or mining.

TABLE 1-6 (Continued)

MONTANA

Lead State Agency	Legislation	Purpose or Relevance
Department of Natural Resources and Conservation	Montana Major Facility Siting Act	Vests in the department the authority to require and review long-range planning by by certain utilities, to give approval to energy generation and conversion plant sites and associated facilities, and to require preconstruction certification of such facilities.
Environmental Quality Council	Montana Environmental Policy Act	The purpose of this act is to declare a state policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the state; and to establish an environmental quality council.
Montana Department of Health and Environmental Sciences	Montana Water Pollution Control Law Montana Water Quality Criteria Montana Pollutant Discharge Elimination System Permit Montana Solid Waste Management Act Montana Refuse Disposal Regulations Montana Clean Air Act Montana Air Quality Regulations	All laws and regulations designed to minimize contamination and pollution and maintain the quality of the environment by establishing standards and maximum amounts of deviation of pollutant substances.
Montana Department of Highways		The Montana Department of Highways may approve or disapprove the relocation of roads and railroads across state lands or across existing highways.

TABLE 1-6 (Continued)

MONTANA (Continued)

Lead State Agency	Legislation	Purpose or Relevance
Montana Department of State Lands		The Department of State Lands may grant or deny surface-mining permits.
	Montana Strip and Underground Mine Reclamation Act	The Act and promulgated rules contain detailed standards regarding the method of mining, blasting, subsidence stabilization, water control, back-filling, grading, highwall reduction, topsoiling, and for the reclamation of lands affected by the proposed mining operations.
	Strip Mined Coal Conservation Act	The intent of the Coal Conservation Act is to prevent waste of marketable coal.
	State Antiquities Act Chapter 25 of Title 81, R.C.M. 1947	Administered by the DSL and the Board of Land Commissioners and provides for the registration and protection of historic, prehistoric, archaeologic, palenontologic, scientific, or cultural sites and objects on State Lands.
Board of Land Commissioners	Section 81-103, R.C.M. 1947	Requires that the Board of Land Commissioners and provides for the registration and protection of historic, prehistoric, archaeologic, palenontologic, scientific, or cultural sites and objects on State lands.
	Section 81-501, R.C.M. 1947	Authorizes the Board to grant coal leases.

TABLE 1-6 (Continued)

NEW MEXICO

Lead State Agency	Legislation	Purpose or Relevance
New Mexico Environmental Improvement Agency	Environmental Improvement Act of 1971 NMSA 12-12 through 14	Responsible for environmental management and consumer protection programs, including food protection, water supply and pollution as provided in the Water Quality Act, liquid wastes and solid waste, air quality management as provided in the Air Quality Act, radiation control, noise control, nuisance abatement vector control, occupational health and safety, sanitation of public buildings.
	Air Quality Control Act	Establishes and enforces regulations to prevent or abate air pollution. Requires submission of plans, specifications, and other relevant information prior to issuing a permit for the construction or modification of any new source of air contaminant.
Water Quality Control Commission	Water Quality Control Act	Establishes and administers a comprehensive water quality program and develop a continuning planning process, including adoption of water quality standards as a guide to water pollution control. Also certifies permits to the U.S. Environmental Protection Agency for the discharge of any water contaminant either directly or indirectly into water. Has groundwater regulations pertaining to strip or tunnel mines.

TABLE 1-6 (Continued)

NEW MEXICO (Continued)

Lead State Agency	Legislation	Purpose or Relevance
State Engineer of New Mexico	NMSA Section 75-2-1	Empowered with general supervision, measurement, appropriation, and distribution of the State waters. Responsible for the safety of all State and private dams and providing guidelines to counties for the formulation of local regulations.
State Game Commission	Regulation 563	Responsible for endangered species and sub-species of the State.
State Historic Preservation Officer	Cultural Properties Act, as amended, 1969	Regulates antiquities excavation and collection, and protects historical values on public, Indian Trust, and State lands.
Coal Surfacemining Commission	Coal Surfacemining Act of 1972	Administers the Surfacemining Act, including the setting of standards for mining plans, the procedures for mining plan submission, approval and amendment, and the procedures for permitting and bonding. Issues the necessary permits and licenses to mine after the plan is approved. Responsible for developing reasonable regulations covering the productive reclamation of stripmined land, including grading and revegetation. Administers groundwater regulations pertaining to strip or tunnel mines.

TABLE 1-6 (Continued)

NEW MEXICO (Continued)

Lead State Agency	Legislation	Purpose or Relevance
State Land Office Minerals Division		Responsible for leasing of all mineral rights, excluding oil and gas on State trust lands. Also responsible for issuing rights-of-way signed by the Commissioner of Public Lands, for utility lines or roads which cross State lands.
Bureau of Mines and Mineral Resources		Studies oil, gas, and uranium on State lands.
Public Service Commission		Requires certificates of Public Convenience and Necessity of any public utility plant or system or any extension thereof.

TABLE 1-6 (Continued)

NORTH DAKOTA

Lead State Agency	Legislation	Purpose or Relevance
North Dakota State Department of Health	North Dakota Air Pollution Control Act	Requires plans to issue permit to construct, install, modify, use, or operate any air contaminant source.
	Solid Waste Management and Land Protection Act	Required to approve or disapprove permits for solid waste disposal plans. Also enforces North Dakota New Source Performance Standards.
--Environmental Health and Engineering Services	North Dakota Water Pollution Control Act	Responsible for establishing and administering standards to prevent or abate pollution of State waters.
--Environmental Control	North Dakota Century Code (NDCC 23-25)	Provides means of presenting significant deterioration of state air quality as related to energy development. Involves review of application for permit to construct or operate facilities and monitoring of facilities after operational.
	NDCC 23-29	Requires permits for solid waste disposal facilities
	NDCC 61-28	Responsible for establishing and administering standards to prevent or abate pollution of state waters. Requires application for and receipt of a permit to discharge mine water.

TABLE 1-6 (Continued)

NORTH DAKOTA (Continued)

Lead State Agency	Legislation	Purpose or Relevance
North Dakota State Water Commission	NDCC 61-04	Permit must be secured for all appropriations of water for industrial uses greater than 5000 acre-feet.
	NDCC 61-02 61-16	Permit must be obtained with the approval of the local water management district for construction of dikes or dams for water storage greater than 12.5 acre-feet.
North Dakota State Industrial Commission - State Geologist	NDCC 38-121	Requires a permit for coal exploration and requires the filing of basic coal exploration data with the State Geologist.
North Dakota State Engineer	NDCC 61-04	Permit must be secured for all appropriations of water for industrial use less than 5000 acre-feet.
	NDCC 61-01	Permit must be obtained with the approval of the local water management district for drainage.
North Dakota Land Development	NDCC 15-05	Responsible for leasing of State coal. Also authorized to coordinate leasing activities with Federal leasing in order to prevent speculation.

TABLE 1-6 (Continued)

NORTH DAKOTA (Continued)

Lead State Agency	Legislation	Purpose or Relevance
North Dakota Highway Commission	NDCC 24-01	Authorized to approve or disapprove granting rights-of-way for communication or power lines, pipelines, etc., along or over state highways. Also controls placement of railroad lines affecting state highways.
North Dakota Industrial Commission		Requires permits for drilling for purposes of coal exploration.
North Dakota Public Services Commission	North Dakota Surface Owners Protection Act NDCC Chapter 38-18	Requires approval of surface owners prior to permitting of mining plans. Issues permits for surface mining activities.
	NDCC 38-14	Requires application for and receipt of a permit for coal surface mining and reclamation activities.
	NDCC 49-22	Regulates siting of conversion and transmission facilities through the North Dakota Facility Siting Act. Requires the application for and receipt of: 1. Certificate of site compatibility; 2. Certificate of corridor compatibility, and 3. Route permit for transmission facility within corridor.
North Dakota Coal Development Impact Office	House Bill 1262, Section 15	Authorized to issue State funds to aid areas experiencing impacts due to coal development.
	NDCC 57-62	Authorized to issue financial grants to impacted taxing districts which demonstrate extraordinary expenditures caused by coal development and the growth incidental thereto.

TABLE 1-6 (Continued)

UTAH

Lead State Agency	Legislation	Purpose or Relevance
Air Conservation Committee	Utah Air Conservation Regulations	These regulations do not officially adopt the NAAQS, but the NAAQS are enforceable in the state. Changes to the Utah regulations are presently under consideration.
Utah Bureau of Water Quality	Water Quality Standards for Utah	Important prescribed standards include those which specify maximum permissible concentrations of dissolved solids, minimum permissible concentrations of dissolved oxygen, and permissible temperatures of State waters. Also establishes anti-degradation policy and effluent standards.
State Historic Preservation Officer	Utah State Antiquities Act (HB 366, 1977)	Requires a paleontological survey to be undertaken before mining activities can be begin. No mining or rights-of-way will be approved until the surface management agency has coordinated professional cultural resource (including archaeological, architectural, and historical remains) surveys with the State Historic Preservation Officer.

TABLE 1-6 (Continued)

UTAH (Continued)

Lead State Agency	Legislation	Purpose or Relevance
State of Utah -- Division of Oil, Gas and Mining		This division and the Office of Surface Mining are preparing rules and procedures to implement the applicable initial regulations of SMCRA.
--Division of Health		Reviews air pollution sources, culinary water sources, water treatment and solid waste disposal areas.
--Division of Lands		Utility lines, roads, and railroads crossing state lands would require easements from the division.
--Division of Water Rights		Authorizes diversion structures, channel modifications, slurry lines and water use.
Department of Transportation		Requires authorization for relocation of highways, highway access, utility line crossings of State and Federal aid highways, and wide and heavy load requirements.

TABLE 1-6 (Continued)

WYOMING

Lead State Agency	Legislation	Purpose or Relevance
Wyoming Department of Environmental Quality -- Land Quality Division -- Water Quality Division -- Air Quality Division	Wyoming Environmental Quality Act of 1973 --Land Quality Rules and Regulations, 1975 --Water Quality Standard for Wyoming, 1973 --Wyoming Ambient Air Quality Regulations --Solid Waste Management Rules and Regulations, 1975	Has authority relating to air quality, solid wastes, water quality, and mining and mine-land reclamation. The Land Quality Division issues permits and licenses to mine upon approval of a mining and reclamation plan. Mined-land reclamation provisions of the mining and reclamation plan are administered and enforced by the Land Quality Division. The Air Quality Division issues permits to construct coal mines and permits to construct coal mines and permits to operate coal mines after approval of applications with regard to plans for monitoring and controlling air contaminants. The Water Quality Division issues permits to construct settling ponds and waste water systems. They also issue NPDES permits for discharing waste water. The Solid Waste Division issues construction fill permits and industrial waste facility permits for solid waste disposal during construction and operation of coal mines.

TABLE 1-6 (Concluded)

WYOMING (Continued)

Lead State Agency	Legislation	Purpose or Relevance
Wyoming Industrial Siting Administration	Industrial Development Information and Siting Act, 1975	Requires furnishing extensive information and a state permit before certain facilities can be constructed. Affects developments which include gasification or electric generation proposals. Control does not apply to public properties except as provided by law.
Commissioner of Public Lands	Title 36 Wyoming Statute 1977	The Commissioner is responsible for the administration, leasing, and management of lands owned by the State. Utility lines, roads, and railroad spurs crossing state land require easements from the Commissioner.
Land Use Administration	Land Use Planning Act	The Act requires completion of county land use plans by 1978; these plans could conflict with or modify some energy development proposals.
Wyoming Highway Department		Relocation of highways and all utility line crossings of state and Federal aid highways require authorization.
Wyoming State Engineer		Any storage, impoundment, or use of surface or groundwater for mining and coal processing operations requires a permit from the State Engineer. Water pipelines and diversion structures that could affect other users also require a permit.

Difficulties are far more likely to arise at a local level where specific ecosystems and individual lives and lifestyles would be unavoidably affected by coal development. Conflict is possible between some of these laws and Federal authority. These laws must be veiwed in light of the Secretary's responsibility for coal leasing decisions and for making unsuitability determinations under Section 522 of SMCRA. In Colorado, for example, House Bills 1023 and 1041 give counties and municipalities authority and funding to develop plans for all lands within their boundaries. A key feature provides authority to designate areas or activities of "state interest" so that they may be maintained or protected to preserve specific values. This could include mineral resource areas, areas of historical significance, and areas around important facilities such as airports, utility facilities, and high- way interchanges. Relevant activities that may come under this state interest category include site selection of arterial highways and collector highways, major facilities of a public utility, and development of new communities.

Colorado's House Bill 1041 places primary responsibility for designation of areas and activities of state interest at the local level of government. Permits to develop or undertake activities of state interest in these areas would have to be obtained from local county governments. In addition, Senate Bill 35 gives counties the authority to approve or reject subdivision proposals. As a result, all subdivision plans must be submitted for review by designated agencies and affected municipalities prior to approval.

Colorado presents an unusual situation in that the State has delegated control of mineral resources to local governments. All of the states have authorized local governments to develop their own plans and zoning ordinances. In most of these states, however, localities are specifically denied control over state mineral resources, though individual communities still maintain control over development within their own jurisdiction through local zoning laws.

In New Mexico, local planning and zoning control may extend three miles beyond the boundaries of all cities and five miles for cities with populations over 25,000. Given such a three-mile extension of local control, a small town of ten square miles could have state-authorized development control over an area as much as seven or eight times its actual incorporated area.

Housing demands and the need for greater infrastructural capabilities that will result from increased population from coal development activities could place considerable economic strain on communities and local governments.

In North Dakota, the Coal Development Impact Office is authorized to distribute State funds to assist areas experiencing impacts as a result of coal resource development. Wyoming has passed a 50 percent tax on minerals royalties and an 8 1/2 percent severance tax on mining companies. Some of these funds are to be redistributed for schools, water systems, highways, counties, and municipalities. But unless communities and local governments can be guaranteed that they will not suffer the ultimate cost of coal development, they are likely to take a more conservative position toward development than the states or the Federal government. State and Federal officials will have to coordinate closely with local representatives to assure the protection of both the ecological and human environments.

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CHAPTER 2

THE NATIONAL ENERGY ROLE OF WESTERN AND FEDERAL COAL

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CHAPTER 2

THE NATIONAL ENERGY ROLE OF WESTERN AND FEDERAL COAL

2.1 INTRODUCTION

Fifty-four percent of the coal reserves in the United States are located west of the Mississippi River. Until recently, these reserves played only a limited role as a source of the Nation's coal production, largely because demand for coal was primarily in regions of the East and Midwest which have substantial coal reserves, and which satisfied their demand with coal produced from Appalachian and midwestern coal mines. In the past few years, however, production of western coal has increased rapidly, rising from 60 million tons in 1972 to 166 million tons in 1977 (24 percent of total 1977 coal production in the United States). This upward trend is expected to continue as coal will make an increasingly important contribution to the Nation's energy supplies, especially for electric power generation, and as demand for coal increases in the western states.

Federally owned coal is concentrated in the six key western coal producing states of Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming, which in 1977 accounted for 71 percent of the production of all western coal. Production of Federal coal in these states was 51.7 million tons in 1977, or 43.7 percent of their total coal production and 7.5 percent of national coal production [5].

Other Federal coal is located in Oklahoma, Alabama, Washington, Kentucky, and in small amounts in other states. Production of Federal coal in these areas could be significant regionally or for specialized types of coal such as metallurgical coal.

Federal coal is expected to have a growing importance in national coal production. Of overall western coal reserves, approximately 60 percent is owned by the Federal government and an additional 20 percent is dependent on the availability of complementary Federal coal for its production.

2.2 COAL RESERVES AND CHARACTERISTICS

In describing the production potential of coal, it is customary to distinguish between coal "resources" and "reserves." The term "resource" describes the estimated total amount of coal for which economic extraction could eventually become feasible. The coal "reserve" is that limited portion of the resource which is judged to be minable at a profit under existing market conditions [19]. The total identified coal resource of the United States is estimated to be 1.7 trillion tons [3]. Of this coal only 438 billion tons have thus far been identified with enough certainty and with sufficient economic prospects to be included in the reserve category.

Reserve calculations for western coal are based in many cases on old geologic data and are probably considerably underestimated. The United States Geological Survey has underway a coal exploration program which will generate improved reserve estimates over the next few years.

For this programmatic environmental impact statement, twelve coal regions were selected as basic units for analysis (see Figure 1-1). The twelve regions contain over 92 percent of the reserve base of the United States and account for over 97 percent of the Nation's current coal production.

The regions shown in Figure 1-1 are used throughout this impact statement as the geographic basis for identifying coal production levels and subsequent impacts. The regions were delineated based on similarities of coal characteristics (as shown on the 1960 USGS map of coal fields of the U.S. [1]) and on opportunities for and the likelihood of new or expanded coal production, both from Federal and non-Federal sources.

As discussed further below, the Federal government administers large amounts of coal in six of these coal regions: the Fort Union, Powder River, Green River-Hams Fork, Uinta-Southwestern Utah, San Juan River, and Denver-Raton Mesa Coal Regions. Smaller but still important amounts

of Federal coal are located in the Western Interior and Central and Southern Appalachian Coal Regions, particularly in the States of Alabama and Kentucky. It is within these geographic areas that the preferred Federal coal management program, described in Chapter 3, would function.

Except for some limited Forest Service-acquired lands, the Federal government owns essentially no coal within the Northern Appalachian, Eastern Interior, and Texas Coal Regions. These regions are included in order to fully present the impacts of Federal coal management actions which might cause coal production to shift from regions with significant Federal coal ownership to regions with high production potential for predominantly non-Federal coal.

Certain areas of the Nation with coal, principally eastern Pennsylvania, southern Michigan, central Texas, northern Montana, Arizona, Washington, and Alaska, are not included in any of the twelve coal regions. Several of the areas – such as eastern Pennsylvania, Washington, and Alaska – were isolated from other regions and did not have enough expected coal production by themselves to form a separate region. Other areas – such as central Michigan and central Texas – are not expected to have any significant production in the near future. The San Juan River Coal Region does not include the State of Arizona because it has little Federal coal and it did not have enough projected production to be a separate region.

Table 2-1 shows the estimated coal reserve base and 1976 production for each of the twelve coal regions. Of the total reserves in the West, a large proportion (66 percent) are located in the Powder River Coal Region. The next most important western coal regions are the Fort Union (11 percent of western coal reserves), Western Interior (seven percent), and Green River-Hams Fork (seven percent) Coal Regions. In the East, reserves are divided almost equally between the Appalachian (54 percent) and the Eastern Interior (46 percent) Coal Regions.

The proportion of surface minable coal reserves in the West is significantly larger than for the Nation as a whole. Seventy-four percent (by weight) of the surface minable reserves shown in Table 2-1 are located west of the Mississippi River. Western surface minable reserves in many cases have less overburden and lie in thicker beds than eastern reserves. This generally results in relatively lower mining costs, although these lower costs historically were not enough to compensate for higher transportation costs to eastern coal markets. The Powder River Coal Region in northeast Wyoming and southeast Montana contains 40 percent of the United States' surface minable reserves, and has an exceptionally high average seam thickness of 25 feet (eastern seams are typically four to eight feet thick). Another western region, the Fort Union Coal Region, contains 16 percent of the national reserves of surface minable coal, although it is largely comprised of less valuable lignite.

Coal produced by surface mining has increased steadily as a proportion of national production. In the nineteenth century, all mining was by underground methods. However, surface mining in the United States supplied 24 percent of overall production by 1950 and 56 percent by 1976.

There are substantial variations in the heating value (Btus) of a unit of coal [19]. Eastern coal is almost entirely bituminous coal (94 percent) and anthracite, and has a higher heat content than most western coal. Of total western coal, 75 percent is subbituminous and 15 percent lignite, and only 10 percent is the more desirable bituminous. Although western coal reserves represent 54 percent of the Nation's reserves by weight, on a Btu basis they represent only around 45 percent of total national reserves. The overall distribution of coal types by state is shown in Table 2-2.

Sulfur content is a key factor in assessing the value of coal. The sulfur content of coal in the United States generally ranges from 0.2 to 7.0 percent by weight. The presence of sulfur lowers the quality of coke and the resulting iron and steel products. Sulfur also contributes to corrosion and to the formation of boiler deposits. Sulfur compounds may react with water to form sulfuric acid, which is one of the major deleterious substances in acid mine waters contributing to stream pollution. Most importantly, sulfur compounds are a major source of air pollution, particularly in the form of sulfur dioxide.

The percentage of sulfur is highest in the Appalachian and Eastern Interior Coal Regions. Western Interior Coal Region coals are also relatively high in sulfur content. The sulfur percentage is relatively low in the subbituminous coals and lignite of the western states which contain large Federal coal reserves. Because of the

TABLE 2-1

REGIONAL AND U.S. DEMONSTRATED COAL RESERVE BASE AND PRODUCTION LEVEL

COAL REGION	RESERVE BASE[b] (millions of tons)			PRODUCTION[a] 1976 (thousands of tons)		
	UNDER-GROUND	SURFACE	TOTAL	UNDER-GROUND	SURFACE	TOTAL
Appalachian						
Northern	59,266	6,292	65,558	92,028	83,931	175,959
Central	27,321	7,589	34,910	125,928	80,889	206,817
Southern	1,963	250	2,213	8,605	14,783	23,388
Subtotal	88,550	14,131	102,681	226,561	179,603	406,164
Eastern Interior	71,110	17,801	88,911	55,366	81,075	136,441
Western Interior	10,125	5,467	15,592	339	11,111	11,450
Texas	0	3,271	3,271	0	14,063	14,063
Powder River	86,500	56,024	142,524	119	37,290	37,409
Green River-Hams Fork	13,396	2,147	15,543	768	24,916	25,684
Fort Union	0	23,101	23,101	0	11,414	11,414
San Juan River	1,906	2,258	4,164	17	8,824	8,841
Uinta-Southwestern Utah	6,915	262	7,177	10,144	0	10,144
Denver-Raton Mesa	3,865	0	3,865	1,453	409	1,862
Total of 12 Regions	282,367	124,462	406,829	294,767	368,705	663,472
U.S. Total	296,976	141,361	438,337	294,771	383,914	678,685
Regions as Percent of U.S.	95.1	88.3	92.8	100	96.0	97.8

(a) Source: Reference Number 2,22,23
(b) Source: Reference Number 3

TABLE 2-2

DEMONSTRATED RESERVE BASE[a] OF COALS IN THE UNITED STATES ON JANUARY 1, 1976
POTENTIALLY MINABLE BY UNDERGROUND AND SURFACE METHODS[b]
(million short tons)

STATE	ANTHRACITE		BITUMINOUS		SUBBITUMINOUS		LIGNITE	UNDER TOTAL	SURFACE TOTAL	STATE TOTAL
	UNDER	SURFACE	UNDER	SURFACE	UNDER	SURFACE	SURFACE			
Alabama	-	-	1,724.2	284.4	-	-	- 1,083.0	1,724.2	1,367.4	3,091.6
*Alaska	-	-	617.0	80.4	4,805.9	640.7	- 14.0	5,422.9	735.2	6,158.1
*Arizona	-	-	-	325.5	-	-	-	-	325.5	325.5
*Arkansas	88.6	7.8	163.1	107.0	-	-	- 25.7	251.7	140.5	392.2
*Colorado	25.5	-	8,467.9	676.2	3,972.1	149.2	- 2,965.7	12,465.5	3,791.1	16,256.6
Georgia	-	-	0.5	0.4	-	-	- -	0.5	0.4	0.9
*Idaho	-	-	4.4	-	-	-	- -	4.4	-	4.4
Illinois	-	-	53,128.1	14,841.2	-	-	- -	53,128.1	14,841.2	67,969.3
Indiana	-	-	8,939.8	1,774.5	-	-	- -	8,939.8	1,774.5	10,714.3
*Iowa	-	-	1,736.8	465.4	-	-	- -	1,736.8	465.4	2,202.2
*Kansas	-	-	-	998.2	-	-	- -	-	998.2	998.2
Kentucky,East	-	-	9,072.5	4,467.6	-	-	- -	9,072.5	4,467.6	13,540.1
Kentucky, West	-	-	8,510.4	3,950.4	-	-	- -	8,510.4	3,950.4	12,460.8
Louisiana	-	-	-	-	-	-	- (c)	-	(c)	(c)
Maryland	-	-	913.8	134.5	-	-	- -	913.8	134.5	1,048.3
Michigan	-	-	125.2	1.6	-	-	- -	125.2	1.6	126.8
*Missouri	-	-	1,418.0	3,596.0	-	-	- -	1,418.0	3,596.0	5,014.0
*Montana	-	-	1,385.4	-	69,573.5	33,843.2	- 15,766.8	70,958.9	49,610.1	120,569.0
*New Mexico	2.3	-	1,258.8	601.1	889.0	1,846.8	- -	2,150.1	2,447.9	4,598.0
North Carolina	-	-	31.3	0.4	-	-	- -	31.3	0.4	31.7
*North Dakota	-	-	-	-	-	-	- 10,145.3	-	10,145.3	10,145.3
Ohio	-	-	13,090.5	6,139.8	-	-	- -	13,090.5	6,139.8	19,230.3
*Oklahoma	-	-	1,192.9	425.2	-	-	- -	1,192.9	425.2	1,618.1
*Oregon	-	-	(c)	-	14.5	2.9	- -	14.5	2.9	17.4
Pennsylvania	6,966.8	142.7	22,335.9	1,391.8	-	-	- -	29,302.7	1,534.5	30,837.2
*South Dakota	-	-	-	-	-	-	- 426.1	-	426.1	426.1
Tennessee	-	-	627.2	337.9	-	-	- -	627.2	337.9	965.1
*Texas	-	-	-	-	-	-	- 3,181.9	-	3,181.9	3,181.9
*Utah	-	-	6,283.8	267.9	1.1	-	- -	6,284.9	267.9	6,552.8
Virginia	137.5	-	3,277.0	888.5	-	-	- -	3,414.5	888.5	4,303.0
*Washington	-	-	255.3	-	835.3	481.5	- 8.1	1,090.6	489.6	1,580.2
West Virginia	-	-	33,457.4	5,149.1	-	-	- -	33,457.4	5,149.1	38,606.5
*Wyoming	-	-	4,002.5	-	27,644.8	23,724.7	- -	31,647.3	23,724.7	55,372.0
Subtotal Western States	114.1	7.8	26,785.9	7,543.0	107,736.2	60,689.0	- 32,533.6	162,338.1	100,773.5	235,407.6
Subtotal Eastern States	7,106.6	142.7	155,251.8	39,362.1	-	-	- 1,083.0	134,638.5	40,587.8	202,930.3
TOTAL	7,220.7	150.5	182,037.8	46,905.1	107,736.2	60,689.0	- 33,616.6	296,976.6	141,361.6	438,337.9

Source: Reference Number 3.

(a) Includes measured and indicated resource categories as defined by the USBM and USGS and represents 100% of the coal in place.
(b) Figures have been rounded.
(c) Quantity undetermined (basic resource data do not provide the detail required for delineation of reserve base).

*Western states including Alaska

different heating (Btu) values of coal, a given sulfur percentage by weight involves varying sulfur content by energy provided. Western coal is also typically low in sulfur content per Btu, although less so than the sulfur percentage by weight would suggest.

Generally, coal with less than one percent sulfur by weight is considered "low sulfur" coal. Only 16 percent of eastern coal is considered low sulfur, compared with 71 percent of western coal (see Tables 2-3 and 2-4). Eighty-four percent of the Nation's low sulfur coal is located in the West. On a tonnage basis, there are nevertheless substantial low sulfur reserves in the East, much of it metallurgical coal.

Within the six western states with major Federal coal ownership, coal mining will be concentrated in areas which are identified by the U.S. Geological Survey as Known Recoverable Coal Resource Areas (KRCRAs) (see Figure 2-1). The total area included within the KRCRAs defined as of March 1978 was 18 million acres (see Table 2-5). It is expected that about 25 million acres will be included in KRCRAs when mapping is completed. Around half of this acreage is expected to have coal of medium or high development potential. By comparison, the total land area of the six western Federal coal states is 396 million acres.

The distribution of coal ownership within KRCRAs is shown in Table 2-5. In many cases, surface ownership differs from subsurface ownership. The largest single ownership category is private surface and Federal coal, which includes 34 percent of the total KRCRA acreage. The second largest category is private surface and non-Federal (usually private) coal, covering 29 percent of the total acreage. Federal surface administered by the BLM with Federal coal and Federal surface administered by The Forest Service with Federal coal cover 21 percent and five percent of total KRCRA acreage, respectively. Finally, state surface and non-Federal (usually state) coal has five percent of the acreage.

Of the total KRCRA acreage, 71 percent of the surface is non-Federally owned. For Federal coal alone, only 44 percent of the surface is owned by the Federal government. Federal subsurface ownership of the coal, on the other hand, covers 66 percent of the total KRCRA acreage. Mainly because the Federal ownership share is unusually high (80 percent) in the Powder River Coal Region, where coal seams are exceptionally thick and contain large amounts of coal per acre, Federal coal reserves in the West are estimated to be 72 percent of total western KRCRA reserves.

2.3 HISTORY OF NATIONAL COAL USE

Coal was the primary energy source upon which the Nation's early industrial and economic growth was based. Basic industries such as railroads, steel, and, later, electric power generation were developed and rapidly expanded through the production and use of coal. The coal industry reached a 100-million ton level of production by 1880 and 212 million tons by 1900. Stimulated by World War I, coal production reached 579 million tons in 1918. Coal production declined after the war (particularly during the Depression), reaching a low in 1932 of 310 million tons. With World War II, production again rose to new heights, reaching a peak in 1947 of 631 million tons [20].

Once again, however, the coal industry went into decline and reached its post-war low of 392 million tons in 1954. For the next 10 years, while major year-to-year fluctuations sometimes occurred, the basic level of coal use increased only slightly. But by the mid-1960's, the industry had begun an upward trend that by 1977 had reached an annual production level of 689 million tons, the highest ever.

For many years the major coal use categories were railroads, manufacturing and mining industries, retail dealer deliveries, coke plants, and electric utilities. In 1944, railroads consumed 132 million tons of coal. The introduction of diesel locomotives and electrification, however, caused the railroad market for coal to virtually disappear by the early 1960's. Also, the use of coal by ships has been displaced almost entirely by oil. Retail coal deliveries for space heating declined steadily over the years, from more than 122 million tons in 1944 to seven million tons in 1977.

Consumption of coal by coke plants fell from 107 million tons in 1955 to 77 million tons in 1977. The gradual decline in this use resulted from technological changes in the coking processes, including increased injection of supplemental fuels and modification of blast furnace practices. Nevertheless, it is expected that the demand for coking coal will be reasonably steady over the near term,

TABLE 2-3

THE DEMONSTRATED RESERVE BASE OF COALS OF THE WESTERN UNITED STATES ON JANUARY 1, 1974, BY MINING METHOD AND SULFUR CONTENT

(million tons)

STATE	MINING METHOD	SULFUR CONTENT, WEIGHT-PERCENT				
		<1.0	1.1-3.0	>3.0	UNKNOWN	TOTAL
Alaska	Underground	4,080.8	163.2	0	0	4,246.4
	Surface	7,377.8	21.0	0	0	7,399.0
Arizona	Surface	173.2	176.7	0	0	350.0
Arkansas	Underground	43.4	310.3	29.2	19.1	402.4
	Surface	37.9	152.9	17.1	55.2	263.3
Colorado	Underground	6,751.3	640.0	47.3	6,547.4	13,999.2
	Surface	724.2	146.2	0	0	870.0
Iowa	Underground	1.6	226.7	2,105.9	549.2	2,884.9
Kansas	Surface	0	309.3	695.6	383.2	1,388.1
Missouri	Underground	0	134.2	3,590.2	2,350.5	6,073.6
	Surface	0	47.8	1,635.8	1,730.0	3,413.7
Montana	Underground	63,464.4	1,939.9	456.2	0	65,834.3
	Surface	38,182.5	2,175.4	46.4	2,166.7	42,562.0
New Mexico	Underground	1,894.4	214.1	0.8	27.5	2,136.5
	Surface	1,681.1	579.4	0	0	2,258.3
North Dakota	Surface	5,389.0	10,325.5	268.7	15.0	16,003.0
Oklahoma	Underground	154.5	238.4	202.6	264.3	860.1
	Surface	120.5	88.2	38.8	186.2	434.1
Oregon	Underground	1.0	0	0	0	1.0
	Surface	0.5	0.3	0	0	0.9
South Dakota	Surface	103.1	287.9	35.9	1.0	428.0
Texas	Surface	659.8	1,884.7	284.1	444.0	3,271.9
Utah	Underground	1,916.2	1,397.6	6.8	460.3	3,780.5
	Surface	52.3	149.2	42.6	18.0	262.0
Washington	Underground	431.0	957.7	13.2	42.9	1,445.9
	Surface	172.5	307.7	25.8	2.2	508.1
Wyoming	Underground	20,719.1	4,535.0	1,275.6	2,955.0	29,489.8
	Surface	13,192.9	10,122.4	425.5	105.3	23,845.3
Total[a]	Underground	99,457.7	10,757.2	7,727.8	13,216.2	131,155.6
	Surface	67,866.8	26,774.3	3,516.3	5,106.8	103,256.8
Grand Total		167,324.5	37,531.5	11,244.1	18,323.0	234,412.4

[a] Distribution may not add to total because of the rounding of individual figures.

SOURCE: Reference Number 5.

TABLE 2-4

THE DEMONSTRATED RESERVE BASE OF COALS OF THE EASTERN UNITED STATES ON JANUARY 1, 1974, BY MINING METHOD AND SULFUR CONTENT
(million tons)

STATE	MINING METHOD	SULFUR CONTENT, WEIGHT-PERCENT				
		<1.0	1.1-3.0	>3.0	Unknown	Total
Alabama	Underground	589.3	1,106.7	14.8	176.2	1,887.0
	Surface	35.4	83.2	1.6	1,063.2	1,183.4
Georgia	Underground	0.3	0	0	0.2	0.5
	Surface	0	0	0	(b)	0
Illinois	Underground	1,034.7	5,848.4	33,647.6	12,908.4	53,439.1
	Surface	60.4	1,493.0	9,321.3	1,347.8	12,222.5
Indiana	Underground	443.5	2,746.6	4,355.1	1,402.5	8,947.7
	Surface	105.3	559.2	907.3	101.6	1,673.4
Kentucky, East	Underground	5,042.7	2,391.9	212.7	1,814.0	9,461.3
	Surface	1,515.7	929.9	86.8	915.3	3,447.7
Kentucky, West	Underground	0	386.0	7,226.4	1,107.1	8,719.5
	Surface	0.2	177.8	2,017.5	1,708.8	3,904.3
Maryland	Underground	106.5	623.9	171.2	-	901.6
	Surface	28.6	66.6	16.2	34.6	146.0
Michigan	Underground	4.6	84.9	20.8	7.0	117.3
	Surface	-	0.5	0.1	-	0.6
North Carolina	Underground	-	-	-	31.3	31.3
	Surface	-	-	-	0.4	0.4
Ohio	Underground	115.5	5,449.9	10,109.4	1,754.1	17,428.9
	Surface	18.9	991.0	2,524.9	117.9	3,652.7
Pennsylvania	Underground	7,179.7	16,195.2	3,568.1	2,864.8	29,807.8
	Surface	138.6	718.4	231.5	89.5	1,178.0
Tennessee	Underground	139.3	370.0	101.4	53.9	664.6
	Surface	65.5	163.2	55.2	34.1	318.0
Virginia	Underground	1,728.5	945.4	12.0	238.3	2,969.2
	Surface	411.6	218.1	2.1	46.7	678.5
West Virginia	Underground	11,086.6	12,583.4	6,552.9	4,142.9	34,365.8
	Surface	3,005.5	1,422.8	270.4	509.6	5,208.0
TOTAL	Underground	27,471.2	48,732.3	65,992.4	26,545.7	168,741.6
	Surface	5,385.7	6,823.7	15,434.9	5,969.5	33,613.8
GRAND TOTAL[a]		32,856.9	55,556.0	81,427.3	32,515.2	202,355.4

[a] Distribution may not add to total because of the rounding of individual figures.

[b] Undetermined.

Source: Reference Number 5.

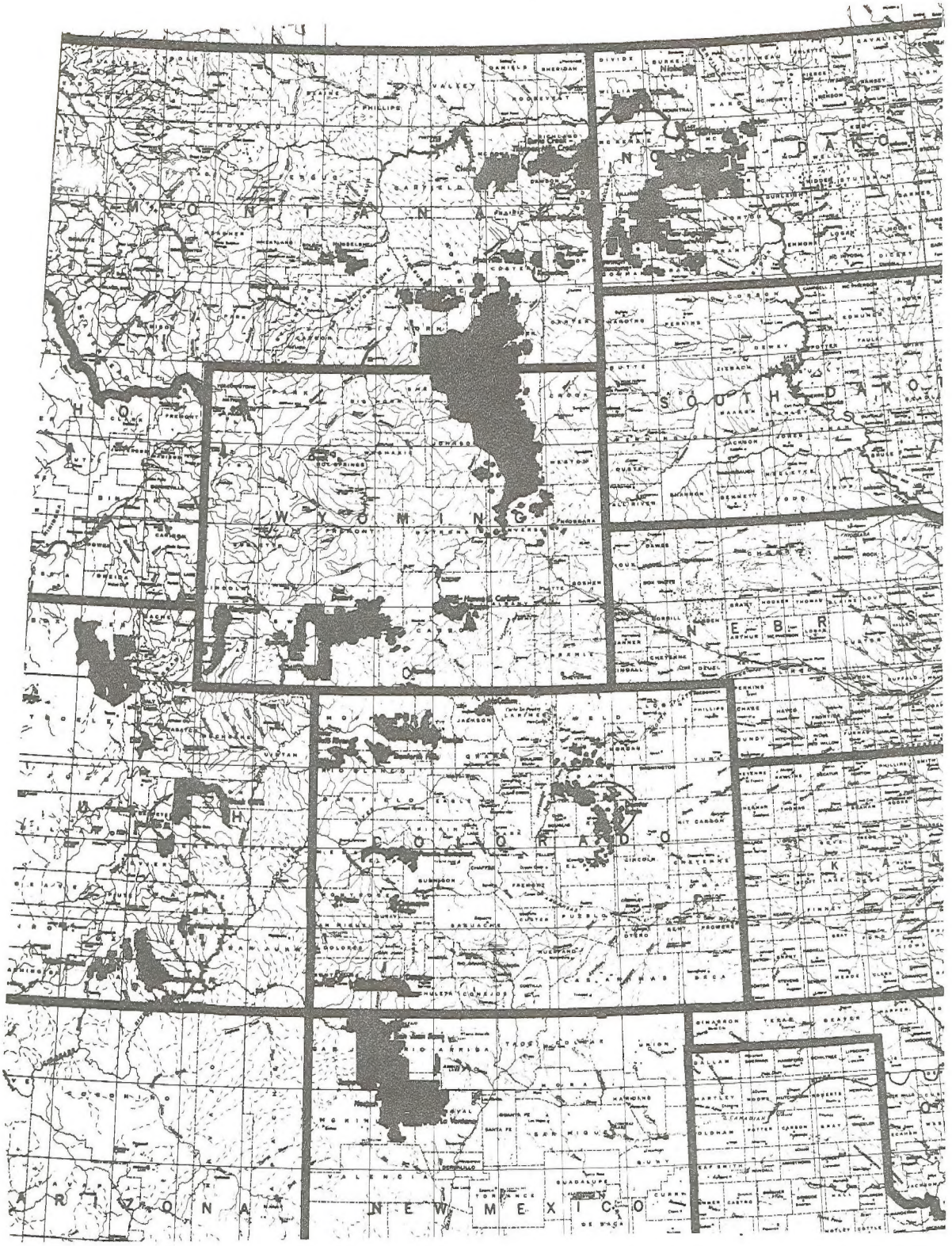


FIGURE 2-1

KNOWN RECOVERABLE COAL RESOURCE AREAS (KRCRAs)

TABLE 2-5

KRCRA COAL AND SURFACE OWNERSHIP[a]
(Acres)

REGION AND KRCRA	PUBLIC DOMAIN SURFACE FEDERAL COAL(b)	PUBLIC DOMAIN SURFACE NONFEDERAL COAL	PRIVATE SURFACE FEDERAL COAL	PRIVATE SURFACE NONFEDERAL COAL	STATE SURFACE FEDERAL COAL	STATE SURFACE NONFEDERAL COAL	FOREST SERVICE SURFACE FEDERAL COAL	FOREST SERVICE SURFACE NONFEDERAL COAL	OTHER SURFACE FEDERAL COAL(c)	OTHER SURFACE NONFEDERAL COAL	GRAND TOTAL
Fort Union Region											
North Dakota KRCRAs											
Bowman-Gascoyne			74,910	131,680	2,120	2,240	2,890		50,730	18,990	283,560
Dickinson			80,440	310,520	320	2,240			4,440	1,000	398,960
Knife River	640		322,600	802,890	600	27,960			3,740	4,610	1,163,040
New England-Mott	40		186,970	346,680	160	9,040			20,650	1,280	564,820
Niobe			880	15,040		120					16,040
Velva			3,200	17,600		120					20,920
Williston-Avoca	120		42,160	18,840	440	2,880			300	290	65,030
Total	800	0	711,160	1,643,250	3,640	44,600	2,890	0	79,860	26,170	2,512,370
Montana KRCRAs											
Burns Creek-13 Mile Creek	400	320	98,640	120,480	3,440	15,360					238,640
Circle	5,680		181,240	225,760	3,360	25,160					441,200
Knowlton	120	1,460	1,840	8,280		1,680			6,000	760	20,140
Lame Jones Creek	1,640		6,320	25,320		3,240			5,720	520	42,760
Pine Hills	1,040		6,200	10,120		600					17,960
Sidney	17,800	480	103,660	159,660	3,800	18,160					303,560
Wibaux Beach	4,200		96,680	70,600	80	2,280					173,840
Total	30,880	2,260	494,580	620,220	10,680	66,480	0	0	11,720	1,280	1,238,100
Fort Union Total	31,680	2,260	1,205,740	2,263,470	14,320	111,080	2,890	0	91,580	27,450	3,750,470
Powder River Region											
Montana KRCRAs											
Powder River Basin	193,430	60	1,046,895	443,560	21,190	107,980	434,515	3,120	2,470	2,960	2,256,180
Wyoming KRCRAs											
Powder River Basin	390,901	1,831	2,767,827	276,606	24,418	365,119	55,986	5,040	68,367	29,243	3,985,338
Powder River Total	584,331	1,891	3,814,722	720,166	45,608	473,099	490,501	8,160	70,827	32,203	6,241,518
Green River-Hams Fork Region											
Wyoming KRCRAs											
Hanna-Carbon Basin	85,493	160	6,454	116,367	760	7,343			6,649		223,226
Kemmerer	105,260		18,053	125,751	1,163	14,004			2,331		266,562
Rawlins	49,863	40	16,155	48,761	480	5,280	160		3,050	40	123,829
Red Desert	453,267	640	7,834	309,076	80	12,040			880		783,817
Rock Springs	430,487	120	7,739	312,905	249	18,467			4,973		774,940
Total	1,124,370	960	56,235	912,860	2,732	57,134	160	0	17,883	40	2,172,374
Colorado KRCRAs											
McCallum	18,400	240	5,040	15,120	2,640	4,640			800		46,880
Yampa	36,970	3,640	269,300	101,675	640	40,990	2,060	640	10,965	120	467,000
Total	55,370	3,880	274,340	116,795	3,280	45,630	2,060	640	11,765	120	513,880
Green River-Hams Fork Total	1,179,740	4,840	330,575	1,029,655	6,012	102,764	2,220	640	29,648	160	2,686,254
Uinta Southwestern Utah Region											
Utah KRCRAs											
Alton-Kanab	48,040	1,160	27,380	11,450	280	2,680	25,040				116,030
Book Cliffs	42,440	280	39,540	38,960	1,600	6,560					129,380
Henry Mountains	34,540			40		5,480			400		40,460
Kaiparowits Plateau	397,760	2,520	1,780	1,160	80	46,320	71,600	200	10,760	400	532,580
Wasatch Plateau	12,120		36,640	47,320	2,720	5,360	192,650	840			297,650
Total	534,900	3,960	105,340	98,930	4,680	66,400	289,290	1,040	11,160	400	1,116,100

a) Includes Known Recoverable Coal Resource Areas (KRCRAs) defined as of March 1978.
b) Includes BLM administered lands
c) Includes Bankhead-Jones acquired lands, Federal withdrawn lands, and Indian lands.

TABLE 2-5
(Concluded)

KRCRA COAL AND SURFACE OWNERSHIP[a]
(Acres)

REGION AND KRCRA	PUBLIC DOMAIN SURFACE FEDERAL COAL(b)	PUBLIC DOMAIN SURFACE NONFEDERAL COAL	PRIVATE SURFACE FEDERAL COAL	PRIVATE SURFACE NONFEDERAL COAL	STATE SURFACE FEDERAL COAL	STATE SURFACE NONFEDERAL COAL	FOREST SERVICE SURFACE FEDERAL COAL	FOREST SERVICE SURFACE NONFEDERAL COAL	OTHER SURFACE FEDERAL COAL(c)	OTHER SURFACE NONFEDERAL COAL	GRAND TOTAL
Uinta-SW Utah (Continued)											
Colorado KRCRAs											
Danforth Hills	46,850	2,560	101,230	16,970		4,350			640		172,600
Lower White River	152,320	40	13,200	4,700		3,840			2,920		177,020
Paonia-Somerset	31,560	80	65,640	22,690			94,980		600		215,550
Total	230,730	2,680	180,070	44,360	0	8,190	94,980	0	4,160	0	565,170
Uinta Total	765,630	6,640	285,410	143,290	4,680	74,590	384,270	1,040	15,320	400	1,681,270
San Juan River Region											
New Mexico KRCRAs											
La Ventana	172,840	3,420	39,380	8,200	4,960	16,240			58,000	22,800	325,840
San Juan	1,007,140	23,500	165,200	89,940	19,320	115,960	7,040		331,980	75,280	1,835,360
Tsaya	5,320		40	240		6,200			39,420	34,300	85,520
Total	1,185,300	26,920	204,620	98,380	24,280	138,400	7,040	0	429,400	132,380	2,246,720
Colorado KRCRAs											
Cimaroon Ridge	3,120		10,400	4,920			2,000		80		20,520
Durango	27,750	120	58,150	70,680	2,910	20,780	53,610	3,140	480	1,120	238,740
East Cortez	1,720		400	6,160		1,440					9,720
Nucla	1,880			3,080					120		5,080
Total	34,470	120	68,950	84,840	2,910	22,220	55,610	3,140	680	1,120	274,060
San Juan River Total	1,219,770	27,040	273,570	183,220	27,190	160,620	62,650	3,140	430,080	133,500	2,520,780
Denver-Raton Mesa Region											
Colorado KRCRAs											
Denver Basin			94,800	348,980	1,200	28,560			640		474,180
Denver-Raton Mesa Total	0	0	94,800	348,980	1,200	28,560	0	0	640	0	474,180
TOTAL - ALL WESTERN REGIONS	3,781,151	42,671	6,004,817	4,688,781	99,010	950,713	942,531	12,980	638,105	193,713	17,354,472
Southern Appalachian Region											
Alabama KRCRAs											
North Central Alabama	0	0	70,562	520,088	0	14,240	40	0	2,676	394	608,000
TOTAL - ALL EASTERN REGIONS	0	0	70,562	520,088	0	14,240	40	0	2,676	394	608,000

Source: Reference Number 4.

with relatively small further declines resulting from technological changes.

Industrial uses, other than electric power generation, include coal used for general manufacturing and mining and for cement, steel, and rolling mills. Industrial coal consumption has declined from approximately 270 million tons in 1945 to 60 million tons in 1977.

As recently as 1943, coal contributed more than 50 percent of the Nation's total energy. By 1977, it contributed only 18 percent. Except for coke ovens, the declines in the U.S. domestic coal markets following World War II resulted primarily from the rapid takeover of these markets by oil and natural gas. These fuels were cheap, easy to handle, and relatively clean, and thus provided a competition that coal was unable to meet. Table 2-6 shows the historical pattern of decline of coal in these markets.

Compensating considerably for the loss or decline of all but one of its historical markets, and its exclusion from new markets by the rise of oil and gas consumption, has been the rapid growth in the use of coal for electric power generation. As recently as 1950, less than 100 million tons of coal were burned by utilities. By 1977, use of coal for electric power generation reached 475 million tons (producing 47 percent of the Nations's total electric power) and is expected to constitute the major source of future increases in coal use.

The growth since World War II of coal exports has provided additional coal markets, particularly for coals of metallurgical quality. In 1957, during the Suez Crisis, exports reached more than 76 million tons. In recent years, exports generally have been in the mid-50 million ton level, but rose to over 65 million tons in 1975.

2.4 THE GROWTH IN WESTERN AND FEDERAL COAL PRODUCTION

Before 1972, coal production in the six western Federal coal States (Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming) never exceeded 40 million tons or seven percent of national production. In 1962, as shown in Table 2-7, these states produced only 14 million tons, or 3.3 percent of national coal production. Production from all western coal regions was still far lower in 1976 than their proportionate share of the Nation's coal reserves, as seen in Figure 2-2.

Production of Federal coal has been even more minimal. Although in the six western Federal coal states more than 70 percent of the coal is Federally owned, in 1972 the amount of Federal coal produced was only 9 million tons or 20 percent of the six states' total production.

This situation has been changing rapidly. Total western production - including that of Texas, Arizona, and the Western Interior Coal Region - reached 165.4 million tons, or 24 percent of national production in 1977 (see Table 2-8). Coal production from the six western Federal coal states was 118.4 million tons in 1977, up from 39.3 million tons in 1971 (see Table 2-7). Production of Federal coal has also been rising rapidly. In 1977, as shown in Table 2-9, Federal coal production in the six western states rose to 51.9 million tons, a five-fold increase over 1971.

As seen in Table 2-9, Wyoming was the leading Federal coal producing state as of 1977. Production of Federal coal in Wyoming grew from only five million tons in 1973 to 28.3 million tons in 1977. Federal coal production in Montana has also grown rapidly, from 1.9 million tons in 1973 to 10.5 million tons in 1977. Almost all the recent growth in Federal coal production in Montana and a large share of it in Wyoming has been from the Powder River Coal Region.

The increasing production of western and Federal coal is attributable to two key factors. The most important is the sharp rise in the price of oil and natural gas, which has made these fuels less economical to use in new utility boilers. Many new western power plants are coal burning, and are using coal mined in the West. In addition, some western plants now burning oil or gas are converting to coal, and this coal is obtained from the western coal regions.

In the East, there is a much greater traditional use of coal for power generation. Because transportation is a substantial portion of the overall cost of coal, eastern power plants traditionally used eastern coal. The economics of eastern power generation were significantly altered, however, by air quality control regulations under the 1970 Clean Air Act Amendments, particularly with respect to sulfur dioxide emissions. Emission standards were set for new plants which were low enough to prohibit use of most eastern coal unless utilities invested in pollution control equipment, but high enough to permit most western coal,

TABLE 2-6

CONSUMPTION AND EXPORTS OF BITUMINOUS COAL AND LIGNITE
BY CONSUMER CLASS IN SELECTED YEARS 1933-1977 (a)
(thousand short tons)

YEAR	ELECTRIC POWER UTILITIES	COKE PLANTS	STEEL AND ROLLING MILLS	RAIL-ROADS CLASS II	MANU-FACTURING AND MINING(c)	TOTAL INDUS-TRIAL	RETAIL DEALER DELIVERIES	BUNKER FOREIGN & LAKE VESSEL	TOTAL U.S.	EXPORTS	GRAND TOTAL(b)
1933	27,088	40,089	14,129	72,548	84,137	170,814	77,396	2,298	317,685	9,037	326,722
1935	30,936	50,515	16,585	77,109	98,054	191,748	80,444	2,683	356,326	9,742	366,068
1940	49,126	81,386	14,169	85,130	113,423	212,722	84,687	2,989	430,910	16,466	447,376
1945	71,603	95,349	14,241	125,120	130,765	270,096	119,297	3,192	559,567	27,956	587,523
1947	86,009	104,800	14,195	109,296	131,847	255,338	96,657	3,087	545,891	68,667	614,558
1950	88,262	103,845	10,877	60,969	103,785	175,631	84,422	2,042	454,202	25,468	479,670
1955	140,550	107,377	7,353	15,473	98,140	120,966	53,020	1,499	423,412	51,277	474,689
1960	173,882	81,015	7,378	2,101	84,703	94,182	30,405	945	380,429	36,541	416,970
1965	242,729	94,779	7,466	-	94,487(c)	101,953	19,048	655	459,164	50,181	509,345
1970	318,921	96,009	5,410	-	82,909	888,319	12,072	298	515,619	70,944	586,563
1973	386,879	93,634	6,356	-	60,837	67,193	8,200	116	556,022	52,870	608,892
1975	403,249	83,272	2,715	-	59,759	62,474	7,282	24	556,301	65,669	621,970
1976	447,021	84,324	2,743	-	57,750	60,493	6,900	12	598,750	59,406	678,685
1977(d)	474,818	77,380	3,243	-	57,146	60,389	7,020	9	619,616	53,687	673,303

(a) Sources: Reference Numbers 6 and 7.

(b) Differences between the total of consumption plus exports and total production accounted for principally by coal in transit between mines and consumer facilities and coal put into stockpiles.

(c) Includes cement mills, all years, and railroad fuel after 1960.

(d) Preliminary

TABLE 2-7

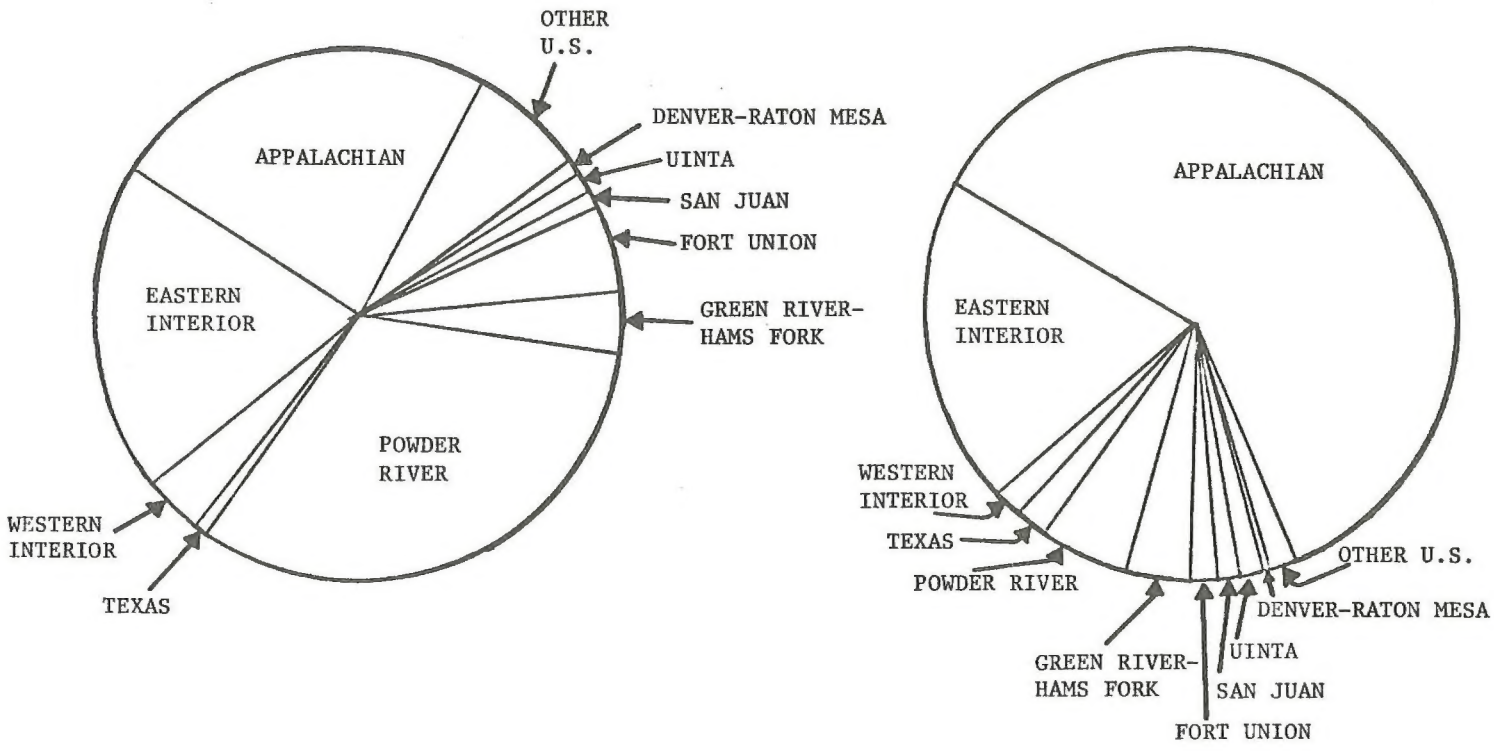
COAL PRODUCTION FROM FEDERAL LANDS IN THE SIX MAJOR COAL-PRODUCING STATES
OF THE WEST IN SELECTED YEARS, 1957-1977,
AND COMPARISONS WITH TOTAL U.S. AND TOTAL STATE PRODUCTION

(tons in millions)

	TOTAL U. S. PRODUCTION			TOTAL PRODUCTION SIX WESTERN STATES[a]				FEDERAL LANDS, SIX WESTERN STATES[b]				
YEAR	SURFACE	UNDER-GROUND	TOTAL	SURFACE	UNDER-GROUND	TOTAL	PERCENT OF U.S.	SURFACE	UNDER-GROUND	TOTAL	PERCENT OF WESTERN	PERCENT OF U.S.
1957	132.1	360.6	492.7	4.6	11.1	15.7	3.2	n.a.	n.a.	4.4	28.0	0.9
1960	130.6	284.9	415.5	5.1	8.5	13.6	3.3	n.a.	n.a.	5.4	39.7	1.3
1962	140.8	281.3	422.1	6.3	7.7	14.0	3.3	n.a.	n.a.	4.9	35.0	1.2
1965	179.4	332.7	512.1	10.3	9.1	19.4	3.8	n.a.	n.a.	5.9	30.4	1.2
1967	203.5	349.1	552.6	12.6	8.6	21.2	3.8	n.a.	n.a.	6.5	30.7	1.2
1971	276.3	275.9	552.2	30.2	9.1	39.3	7.1	n.a.	n.a.	10.1	25.7	1.8
1972	291.3	304.1	595.4	35.0	9.3	44.3	7.4	n.a.	n.a.	8.8	19.9	1.5
1973	292.3	299.4	591.7	43.0	10.0	53.0	9.0	n.a.	n.a.	12.9	24.3	2.2
1974	326.1	277.3	603.4	53.9	10.2	64.1	10.8	n.a.	n.a.	21.5	33.5	3.6
1975	355.6	292.8	648.4	66.9	11.4	78.3	12.1	n.a.	n.a.	31.0	39.6	4.8
1976	383.9	294.8	678.7	82.8	12.5	95.3	14.0	31.7	6.3	38.0	40.2	5.6
1977[c]	416.9	271.6	688.6	105.4	13.4	118.4	17.2	44.0	7.6	51.9	43.8	7.5

(a)Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming.
(b)Total production from Federal lands is for "calendar" years covered; there are differences in some years from other reference data where the latter cover "fiscal" years, i.e., 4.2, 4.9, 9.1 and 10.2 million tons, respectively, in 1960, 1965, 1971, and 1972.
(c)Preliminary

Sources: Reference Numbers 5, 6, 8, 9, and 10.



DISTRIBUTION OF COAL RESERVE BASE

DISTRIBUTION OF COAL PRODUCTION (1976)

SOURCE: Table 2-1

FIGURE 2-2

DISTRIBUTION OF THE COAL RESERVE BASE AND OF 1976 PRODUCTION

TABLE 2-8
COAL PRODUCTION FROM ALL LANDS IN SELECTED YEARS
1957-1977 BY STATES
(thousand tons)

Six Major States:	1957 TOTAL	1962 TOTAL	1967 TOTAL	1972 TOTAL	1973 TOTAL	1974 TOTAL	1975 TOTAL	1976 TOTAL	1977(a) TOTAL
Colorado	3,594	3,379	5,439	5,552	6,233	6,896	8,219	9,437	11,920
Montana	413	382	371	8,221	10,725	14,106	22,054	26,231	29,320
New Mexico	137	677	3,463	8,248	9,069	9,392	8,785	9,760	11,255
N. Dakota	2,561	2,733	4,156	6,632	6,906	7,463	8,515	11,102	12,165
Utah	6,858	4,297	4,175	4,802	5,500	5,858	6,961	7,967	9,240
Wyoming	2,117	2,569	3,588	10,928	14,886	20,703	23,804	30,836	44,500
Sub-total	15,680	14,037	21,192	44,353	53,319	64,418	78,338	95,333	118,400
Other West:									
Arizona	-	-	1,000	2,954	3,247	6,448	6,986	10,420	11,475
Arkansas	508	256	189	428	434	455	488	534	570
Iowa	1,312	1,130	883	851	601	590	622	616	525
Kansas	749	915	1,136	1,227	1,086	718	479	590	630
Missouri	2,976	2,896	3,696	4,551	4,658	4,623	5,638	6,075	6,625
Oklahoma	2,195	1,048	823	2,624	2,183	2,356	2,872	3,635	5,345
Washington	360	235	59	2,634	3,270	3,913	3,743	4,109	5,055
Texas	-	18	5	-	6,944	7,684	11,002	14,063	16,765
Total Other West	8,100	6,498	7,791	15,269	22,423	26,787	31,830	40,042	46,990
Total West	23,780	20,535	28,983	59,622	75,742	91,205	110,168	135,375	165,390
Eastern States:									
Alabama	13,260	12,880	15,300	20,814	19,230	19,824	22,644	21,537	21,220
Illinois	46,993	48,487	65,200	65,523	61,572	58,215	59,537	58,239	53,880
Indiana	15,841	15,709	18,800	25,949	25,253	23,726	25,124	25,369	27,995
Kentucky	74,667	69,212	99,500	121,187	127,645	137,775	143,613	143,972	142,945
Maryland	748	821	1,250	1,640	1,789	2,337	2,606	2,830	3,290
Ohio	36,862	34,125	45,800	50,967	45,783	45,409	46,770	46,582	46,205
Pennsylvania	85,365	65,315	79,400	75,939	76,403	80,462	84,137	85,777	83,225
Tennessee	7,955	6,213	6,750	11,260	8,219	7,541	11,002	9,283	10,320
Virginia	29,506	29,474	37,900	34,028	33,961	34,326	35,510	39,996	37,850
West Virginia	156,842	118,499	152,500	123,743	115,448	102,462	109,283	108,834	95,405
Total East	468,035	400,735	522,400	531,050	515,303	512,077	540,226	542,419	522,335
Grand Total U.S.	491,815	421,270	551,383	590,672	591,045	603,282	650,394	677,794	687,725

(a) Preliminary

Source: Reference Number 5.

TABLE 2-9

COAL PRODUCTION FROM FEDERAL LANDS IN SELECTED YEARS
1957-1977 BY STATES
(thousand tons)

	1957 FEDERAL	1962 FEDERAL	1967 FEDERAL	1972 FEDERAL	1973 FEDERAL	1974 FEDERAL	1975 FEDERAL	1976 FEDERAL	1977(a) FEDERAL
Six Major States:									
Colorado	531	500	2,030	2,386	1,746	2,300	1,600	2,650	4,020
Montana	26	156	115	82	1,940	4,500	9,700	10,500	10,460
New Mexico	34	104	27	206	260	1,000	1,300	1,290	2,340
N. Dakota	412	366	590	1,361	1,535	1,000	300	770	750
Utah	2,957	2,723	1,649	1,980	2,416	3,200	3,800	4,900	5,800
Wyoming	442	1,029	2,112	2,809	4,991	9,500	14,300	17,960	28,290
Sub-total	4,402	4,878	6,523	8,824	12,888	21,500	31,000	38,070	51,660
Other West:									
Arizona	-	-	-	-	-	-	-	-	-
Arkansas	-	-	-	-	-	-	-	-	-
Iowa	-	-	-	-	-	-	-	-	-
Kansas	-	-	-	-	-	-	-	-	-
Missouri	-	-	-	-	-	-	-	-	-
Oklahoma	420	249	144	410	337	-	-	300	240
Washington	-	-	-	-	-	-	-	-	-
Texas	-	-	-	-	-	-	-	-	-
Total Other West	420	249	144	410	337	-	-	300	240
Total West	4,822	5,127	6,667	9,234	13,225	21,500	31,000	38,370	51,900
Total East	764	842	510	988	367	-	-	250	250
Grand Total U.S.	5,586	5,969	7,177	10,222	13,592	-	-	38,620	52,150

(a) Preliminary

Source: Reference Number 5.

which is lower in sulfur content, to be burned without the installation of control equipment. For many eastern and mid-western utilities, the added cost of building a scrubber was large enough that they preferred to substitute western coal even if its energy content was lower and transportation costs were relatively high. Greater ease of passing increased fuel costs through to customers may also have played a part in this utility preference.

Changes in the emission standards for new power plants are required by the 1977 Clean Air Act Amendments. These new standards are expected to reduce substantially the amount of sulfur which can be emitted. Most western coal, like most coal from the East and Midwest, contains enough sulfur to require that new coal-burning power plants use pollution control equipment to meet the expected new standards. The stricter air quality standards will diminish the economic advantage of western coal over eastern and midwestern coal, and will result in power companies in the East and Midwest using more coal from their own regions instead of transporting coal from the West. However, since power plants coming on line before 1983 will largely be using the old air quality standards, it will be some time before the new standards affect western production. Overall demand for western coal will not be greatly affected by the new air quality standards, because most new demand for western coal will be from power plants and industries in the West. The growth in coal demand is expected to be higher in the West than in any other region of the country. An EPA computer analysis of alternative new source performance standards (published in 43 Federal Register No. 237, December 8,1978) indicated that new tighter controls would decrease western coal production by two to five percent, depending on the final standard selected.

Western coal is used mainly for electric power generation, with small amounts used for metallurgical and other purposes. Proportionately somewhat greater amounts of eastern coal are used for metallurgical and other purposes than power generation. The use of western and eastern coal by consumer classification is shown in Table 2-10.

In the eastern United States, the Federal government owns the coal rights to 916 thousand acres. Much of this coal lies within national forests. Around three percent of the coal in Alabama is Federally owned. A significant amount of this coal is interspersed with non-Federal coal and also has non-Federal surface ownership.

Historically, production of Federal coal in the East has never exceeded one million tons per year. In 1977, total eastern production of Federal coal was only 250 thousand tons. However, there is a growing interest in developing Federal coal in the East, especially in Alabama where it could supply metallurgical needs.

2.5 TRENDS IN OTHER SOURCES OF ENERGY

Historically, the United States was able to supply its oil and gas needs largely from domestic sources. However, it now appears that, although world oil and gas supplies might be adequate for some time, continued reliance on these fuels will leave the United States very heavily dependent on foreign nations for its basic energy requirements. The undesirable national security, economic, and other implications of such heavy dependence on foreign energy sources have forced a major national reassessment of future energy directions.

2.5.1 Oil Production Trends

The production of oil in the United States peaked in 1970 and, despite the stimulus of sharply increased prices over the past five years, there has been a continuing domestic production decline. As shown in Table 2-11, the decline in domestic production had to be offset by a large increase in oil imports to meet rising demand. Although overall demand dropped in 1974 and 1975, it again increased in the past two years.

The domestic production decline has been matched by a comparable decline in proven reserves. The discovery of the nearly 10-billion barrel Prudhoe Bay field in Alaska gave a large boost to reserves in the late 1960's. But, by 1975, U.S. crude oil reserves had fallen to a level largely equivalent to the level 10 years earlier (see Table 2-12). Reserves have continued to drop despite the large increase in the number of wells drilled. There were 44,982 completed wells in 1977, the highest level since 1960 [11,30,31].

Sustaining the existing level of domestic oil production will not be easy. At current production rates, more than 25 billion barrels of oil will have to be discovered by 1985 to keep the reserves/production ratio from dropping further. While new discoveries are continually being made,

TABLE 2-10

COAL SHIPMENTS FROM SELECTED WESTERN
AND EASTERN STATES IN 1976 BY CONSUMER CLASSIFICATIONS
(thousands of short tons)

	ELECTRIC POWER UTILITIES	COKE PLANTS	RETAIL DEALER DELIVERIES	OTHER	TOTAL
Western States:					
Arizona	10,258	(a)	(a)	102	10,360
Colorado	5,984	2,583	31	806	9,404
Montana	26,038	(a)	(a)	397	26,435
New Mexico	8,516	858	(a)	345	9,719
North Dakota	10,257	(a)	86	748	11,091
Oklahoma	2,497	491	4	319	3,311
Utah	3,915	1,453	243	1,785	7,396
Washington	4,087	(a)	(a)	24	4,111
Wyoming	28,282	(a)	109	2,761	31,152
Subtotal	99,834	5,385	473	7,287	112,979
Eastern States:					
Illinois	48,385	3,231	5,970	653	58,239
Indiana	21,865	0	3,333	170	25,368
Ohio	40,854	0	4,369	1,290	46,513
Other Eastern States: (a)	248,714	77,604	33,868	52,230	412,416
Subtotal	359,818	80,835	47,540	54,343	542,536
Grand Total	459,652	86,220	48,013	61,630	655,515

(a) Shipments not published on State basis for these states.

TABLE 2-11

U.S. PETROLEUM SUPPLY AND DEMAND
(thousands of barrels per day)

YEAR	PRODUCTION[a]	IMPORTS[b]	DEMAND[c]
1965	9014	2467	11709
1970	11297	3419	14968
1971	11156	3925	15449
1972	11185	4741	16602
1973	10946	6256	17552
1974	10462	6112	16886
1975	10007	6056	16545
1976	9736	7312	17698
1977[d]	9834	8708	18666

(a) Crude oil, lease condensate and natural gas liquids
(b) Crude oil and refined products
(c) May not add up due to losses, changes in stock, and exports
(d) Preliminary

Source: Reference Number 7.

TABLE 2-12

U.S. PROVEN RESERVES OF CRUDE OIL
(billions of barrels)

YEAR END	RESERVES	RATIO RESERVES/PRODUCTION
1965	31.3	9.5
1970	39.0	9.5
1971	38.0	9.3
1972	36.3	8.9
1973	35.3	8.8
1974	34.2	8.9
1975	32.6	8.9
1976	30.9	8.7
1977	29.5	8.2

Source: Reference Number 11.

they are more difficult and expensive to produce as the easier finds are exhausted. The greatest potential for new finds appears to be in costly offshore areas. Recent discoveries also suggest that the Overthrust Belt in the Rocky Mountains may contain major oil reserves.

Stable or declining domestic oil production would have fundamental national security and economic implications. The U.S. payments for foreign oil imports rose from $2.0 billion in 1965 to $41.8 billion in 1977 (see Table 2-13). These payments were a principal factor in the U.S. foreign trade deficit in 1977 of $26.5 billion and the international decline in the value of the dollar. Projections of future oil imports indicate that U.S. payments for foreign oil could be as high as $60 billion by 1985 [11,30,31].

The huge Mexican oil and gas reserves offer the opportunity to widen the number of nations from which the United States imports oil and to reduce supply instability. The use of Mexican oil and gas of course will not solve balance of payments problems.

The effect of increased coal production, even of modest magnitude, will be significant in terms of reducing dependence on imported oil. By increasing coal production from the 1976 level of 679 million tons to a 1985 production level of 1.2 billion tons as proposed in the President's Energy Plan [12], the importing of around 2.4 million barrels of oil a day, or 803 million barrels a year could be avoided. This would result in reductions in import payments of more than $10 billion.

The problems of dependence on foreign oil supplies have been underscored by recent instability in Iran and the Middle East generally. Future oil supplies are reduced and prices appear uncertain at this time. If future supplies are reduced and oil prices rise substantially, it may prove necessary to call upon domestic coal production for an even larger energy role than has been expected.

2.5.2 Natural Gas Production Trends

The pattern of domestic production of natural gas has closely followed that of crude oil. Natural gas output peaked in 1973 and has since declined. The proven reserves of natural gas have declined since the mid-1960's, as shown in Table 2-14. Unlike petroleum, natural gas imports amounted to only about five percent of total U.S. consumption in 1977 and have not made up for domestic production declines. Falling gas supplies have caused gas distributors to curtail and/or interrupt deliveries to industrial customers, restrict the hook-up of new residential and commercial accounts, and limit boiler fuel usage.

The extent to which natural gas will be available to meet future energy requirements is very uncertain at this time. Large foreign supplies of natural gas may be obtained from Mexico or could be transported in liquified form from more distant foreign supply areas. Major Canadian gas discoveries have recently been made in Alberta. Domestically, Alaskan gas could provide substantial supplies or exploration on the outer continental shelf might result in discovery of significant amounts of gas. The recently enacted Natural Gas Policy Act of 1978 aims to stimulate greater production of domestic gas supplies by raising the regulated price and providing for deregulation by 1985. In the short term, the act's most significant consequence has been to abolish the price differential between interstate and intrastate gas. This has resulted in an unexpected increase in the supply of gas which at least temporarily is likely to delay some industrial and utility conversions to coal.

The conversion of coal into synthetic gas is expected to have considerable importance at some time in the future. However, high costs and uncertain technology make it unlikely that large supplies of synthetic gas could be produced before the 1990's [7,30,32].

2.5.3 Nuclear Power Trends

Nuclear power plants produced 11.8 percent of the Nation's electric power in 1977. At that time there were 68 nuclear power plants in operation or in the startup phase with a total capacity of more than 49,000 megawatts. As shown in Table 2-15, 154 other nuclear plants with a total design capacity of 172,000 megawatts were being built, on order, or announced. If all these plants were to be in operation by 1990, they would provide as much as 27 percent of expected national power requirements.

Nuclear plants are currently cost competitive with coal plants and rapid expansion of nuclear power generation could significantly diminish future coal requirements. In recent years, however, the expected growth rate of nuclear energy has been sharply reduced by a number of concerns about its cost and safety. Safety concerns have

TABLE 2-13

VALUE OF CRUDE OIL/PETROLEUM PRODUCT IMPORTS, 1965 TO 1977
(millions of current dollars)

YEAR	CRUDE OIL	PETROLEUM PRODUCTS	TOTAL
1965	$1,120	$ 924	$2,044
1970	1,260	1,483	2,743
1971	1,687	1,656	3,343
1972	2,369	1,989	4,358
1973	4,240	3,498	7,738
1974	15,253	11,013	26,266
1975	18,290	6,768	25,058
1976	25,456	6,646	32,102
1977[(a)]	33,398	8,413	41,811

[(a)]Preliminary

Source: Reference Number 7.

TABLE 2-14

U.S. PROVEN RESERVES OF NATURAL GAS
(trillion cubic feet)

YEAR	RESERVES
1965	286.5
1970	290.7
1971	278.8
1972	266.1
1973	250.0
1974	237.1
1975	228.2
1976	216.0
1977	208.9

Source: Reference Number 11.

TABLE 2-15

STATUS OF NUCLEAR POWERPLANTS, END OF 1977

STATUS	NUMBER	CAPACITY (Megawatts)
In Operation or Startup	68	49,000
Construction Permit Granted	80	87,000
Construction Started	(67)	(73,000)
No Construction	(13)	(14,000)
Construction Permit Pending	52	58,000
Order Placed for Plant	13	16,000
Announced	9	11,000
	222	221,000

Source: Reference Number 7.

involved questions of nuclear proliferation, radiation hazards, spent-fuel storage, and radioactive waste management [7,29,33].

2.5.4. Hydroelectric Power Trends

Hydroelectric plants in 1977 accounted for 68,300 megawatts, or 12 percent of the total installed electrical generating capacity of the United States. This was about 25 percent less than in 1974 and 1975, due primarily to drought conditions in many western states. In the 1930's and 1940's, hydroelectric power provided as much as 30 percent of total domestic electricity needs. Although hydroelectric power is relatively safe, nonpolluting, low in cost, and does not consume fuels, its expansion in recent years has been limited by the lack of good new sites and opposition on environmental and cost grounds. The possibilities for expanding capacity at existing dams and for development of hydroelectric facilities on smaller rivers and streams for more local use are being investigated [7,34].

2.5.5 Nontraditional Energy Sources

Although a number of nontraditional energy sources are under active investigation, these efforts are still mostly in their infancy and these sources are not expected to make a significant contribution to energy supplies by 1990. These sources are briefly described below.

2.5.5.1. Unconventional Sources of Gas. There are four types of gas resources receiving the greatest current attention. The first is gas in geopressured zones of the Gulf Coast in the form of methane-rich waters at depths below 10,000 feet. Although estimated to encompass a vast resource base (3,000 to 50,000 trillion cubic feet), there are numerous technical and environmental problems to be resolved before gas from this resource can be developed [7,36]. The second is gas in "tight" (impermeable) sandstone formations in the Rocky Mountain States. Again, the resource is considerable but the recovery technology has yet to be developed. Gas is also found in Devonian Shales of the Appalachian States. This gas is currently being produced in local areas and efforts are underway to enhance production. Finally, recovery of methane from coal seams in advance of mining operations is technologically possible. Production of this resource would improve mine safety and make a regionally important impact on gas supply availability [7,37]. Uncertainty about legal ownership of coal seam methane and the right to produce it are currently inhibiting its production.

2.5.5.2 Oil Shale. High grade deposits of oil shale, located primarily in Colorado, Utah, and Wyoming, may contain as much as 600 billion barrels of oil, and lower grade deposits may contain an additional 1.2 trillion barrels. Given favorable economic conditions, as much as 80 billion total barrels of shale oil could be extracted from this resource. A number of optimistic production forecasts were made in the 1973-74 period; it soon became evident, however, that production costs would be much higher than originally expected. Unless there are breakthroughs in technology, shale oil is not expected to be competitive with oil and gas until their prices rise considerably above current levels. Even then, shale development might not be competitive because historically increases in prices have tended to lag behind increases in cost [7,38].

In 1974, the Interior Department awarded four competitive oil shale leases. Construction of in situ experimental systems is now proceeding on two leases in western Colorado.

2.5.5.3 Tar Sands. Although found in at least nine states, the largest known resource of bitumen-bearing rocks (tar sands) is located in Utah, encompassing a resource base roughly equivalent to 28 billion barrels of oil. Because of various constraints and high extractive costs, significant production from this resource is not expected in the United States in the near future [7]. There are much better prospects, however, for development of the major oil sand resources in the Canadian province of Alberta.

2.5.5.4 Alcohol Fuel Uses. Alcohol fuels include methanol and ethanol. Most methanol traditionally comes from natural gas. However, methanol can also be produced from coal or biomass sources.

Ethanol can be produced by the direct hydration of ethylene gas and by the process of fermentation and distillation using various agricultural products such as grain or molasses as feed stock. Ethanol fuel may be a way to effectively use extensive food and grain surpluses in the United States and Canada.

Satisfactory engine operation is possible on existing automobiles that are fueled with up to 15 percent methanol or ethanol gasoline blends and require no carburetor readjustment. Also, the present automobile engine can be retrofitted to run successfully on 100 percent methanol. Brazil has been producing ethanol from excess sugar and is using ethanol gasoline blends as an automobile fuel. However, there is a great deal of uncertainty about the prospects for a nationwide alcohol-gasoline fuel system based on alcohols derived from biomass resources. The principle disadvantages of alcohols are their toxicity, with ethanol being the least toxic. Methanol vapors are more toxic than gasoline vapors. Other methanol disadvantages are its poor cold start capability, aldehyde emissions, and a lower heat of combustion.

An advantage to the use of alcohols in gasoline relates to fuel octane rating. When added to gasoline, both methanol and ethanol boost the octane value of the original gasoline in much the same way as tetra-ethyl lead and no-lead additives in gasoline [21].

2.5.5.5 Geothermal Energy. While it constitutes an enormous potential resource base, the heat of the earth has so far seen limited use as an energy source. Natural hot dry steam at Geysers, California, is the fuel source for a series of plants generating 520-megawatts of electricity. Hot water in Oregon, Idaho, and other western states has been used for local space heating purposes. Other plans are currently being developed to employ hot waters for power production in certain western states and Hawaii and for space heating in several eastern states. However, there is still a great deal of uncertainty about reservoir longevity, since these hot waters are essentially nonrenewable. This feature, combined with technological difficulties and problems of corrosion, has tended to discourage private investment thus far [7,29,39].

2.5.5.6 Solar Energy. The basic solar energy categories are solar heating and cooling of buildings, agricultural and industrial process heat, wind energy conversion, photovoltaic conversion, solar thermal conversion, and biomass. Solar heating and cooling, agricultural and industrial process heat, wind energy, and biomass appear to have potential for significant uses between now and 1990. Technologies need to be developed further for other solar energy sources to attain a reasonably competitive level. On an overall basis, solar energy is not expected to contribute more than one to two percent of the total water and space heating energy requirements by 1990. Its impact is more likely to be felt in the period between 2000 and 2020, when forecasts suggest that as much as 10 percent of U.S. energy needs could be met by solar sources. Technological breakthroughs, major subsidy programs, or other developments could cause the earlier use of this resource [7, 29].

2.5.5.7 Energy from the Ocean. The renewable energy sources from the ocean include the following:

- Ocean thermal energy conversion - based on harnessing the thermal differences of at least 17°C between warm surface water and cold deep sea water (found primarily between the Tropics of Cancer and Capricorn).
- Tidal energy conversion - plants proposed for two potential sites in the United States, one in Maine at the Bay of Fundy and the second in Cook Inlet, Alaska. The maximum total capacity of these plants would be 3,600 megawatts and the annual energy output would represent about 1 percent of the electricity produced in the United States.
- Other ocean energy forms that have been the subject of limited study are wave energy, ocean current energy, ocean wind energy, and salinity gradient energy conversion [7, 29].

These sources are not expected to provide significant amounts of energy until the 2000-2020 period at the earliest.

2.5.5.8 Nuclear Fusion. Since it would use low cost, inexhaustible fuels, nuclear fusion is generally considered environmentally more desirable than nuclear fission plants. Although the feasibility of key design principles was recently verified in an important experiment at Princeton University, there are major engineering problems to be overcome before nuclear fusion is a reality. Even if problems are successfully resolved, nuclear fusion cannot be expected to make a major contribution for probably another 50 years [7,35].

2.5.6 Energy Conservation

There are significant possibilities for reducing energy needs through conservation. In many cases, conservation measures might well be more cost effective than development of new energy sources.

The National Energy Plan formally proposed by President Carter in 1977 [12] called for measures such as wellhead taxes on crude oil, phased deregulation of natural gas prices, taxes on industrial use of oil and gas, and selected electricity rate policies, all of which were designed at least in part to dampen and discourage wasteful energy consumption practices. Residential conservation possibilities include weatherization of homes, use of more efficient appliances, and installation of heat pumps. Transportation energy use could be reduced by improvements in operating procedures, new equipment, pumping technologies, and modifications of motor vehicle engine propulsion systems. Possible areas of savings in the industrial sector include waste heat utilization, industrial waste application and process changes.

The various conservation measures could have a substantial impact on energy consumption, reducing it by perhaps as much as 10 percent by 1990 if there are major technology advances. Whether such large scale energy savings will be achieved through conservation efforts still remains, however, an open question [7, 40].

2.6 EXPECTED FUTURE COAL USE

While the precise rate is in considerable doubt, there is little question that the Nation's overall energy requirements will continue to grow. There is little likelihood of supplying that growth from domestic oil and natural gas (see discussion in Sections 2.5.1 and 2.5.2). New technologies and energy forms are still unproven, and cannot be relied on over the next decade or so. Nuclear power could supply large amounts of additional energy, but for the time being its growth is inhibited by concerns about its safety. Given these circumstances, in the next decade the United States will be forced to address the problem of growing energy demands largely through a combination of three basic types of actions: (1) expand use of coal as a domestic energy source; (2) obtain increased foreign supplies of oil and gas; and (3) curb demands by greater energy conservation measures.

2.6.1 Coal in the National Energy Plan

The role of coal in the President's April 1977 National Energy Plan [12] was previously discussed in Section 1.4.1. The National Energy Plan included a reduction in the expected level of imports of foreign oil as a prime objective. It proposed to reduce foreign imports from a projected level of 11.5 million barrels per day in 1985 without the plan, to 7.0 million barrels per day with the plan. This reduction was to be achieved by adoption of additional conservation measures (2.1 million barrels per day of oil saved) and by increased substitution of coal for oil and gas (2.4 million barrels per day).

Under the National Energy Plan, total coal production was expected to rise from 679 million tons per year in 1976 to 1.26 billion tons per year in 1985. This would represent an increase in coal production of about 200 million tons per year more than would have been expected without the plan.

2.6.2 Department of Energy Coal Projections

Projections of future energy production and consumption are based on many assumptions. Inevitably, these assumptions change, sometimes rapidly. Accordingly, it is necessary to use the best projections possible at a given time, while remaining ready to revise the projections as circumstances are altered. Already, the projections in the National Energy Plan are somewhat out of date and are being revised.

In preparing this programmatic environmental impact statement it seemed desirable to have the most current projections of future coal production. A regional breakdown with a fairly high degree of geographic resolution was also needed for the analytical purposes of this statement. Accordingly, the Department of the Interior requested that the Department of Energy (DOE) provide a new set of coal production projections especially developed for use in the preparation of this statement. These projections for 1985 and 1990 were developed by the DOE Leasing Policy Development Office and submitted in a report to the Department of the Interior in June 1978 [13]. This report focuses on projections for the six key western Federal coal producing states. It is available upon request.

The DOE energy and consumption projections incorporate assumptions on future electric power requirements, oil and gas prices, and nuclear power development. Other assumptions involve air

quality controls, transportation costs, and labor cost escalation. Different sets of assumptions were developed for low, medium, and high projections of western coal development. For example, the low oil price assumption for 1985 was $13 per barrel, the medium assumption $15 per barrel, and the high assumption $20 per barrel. The electric power annual growth rate, which is the single most important assumption, was 4, 4.8, and 5.8 percent for the 1985 low, medium, and high projections, respectively. (Electrical growth rates provide an example of the difficulty in selecting assumptions to make energy production projections. They have behaved erratically in recent years, making future rates difficult to predict. From 1969 to 1973, the average annual electricity growth rate was 7.1 percent. Following the OPEC embargo, the growth rate declined to 0.2 percent in 1974 and 2.6 percent in 1975. In 1976 the electricity growth rate rose again to 6.3 percent but then declined to 4.6 percent in 1977 and 3.7 percent in 1978. The average for the past three years was 4.9 percent, slightly above the medium assumption.)

The low modeling assumptions were selected to favor energy sources other than coal and to favor eastern sources for coal produced. The high assumptions favor both higher coal use and western coal production. Low, medium, and high projections were generated for both 1985 and 1990.

The DOE projections were obtained from a large linear programming model and were calculated using a computer. For each coal model demand region, the model user specifies in advance electric power consumption, industrial coal use, and other types of coal use. The model then calculates the lowest cost way of providing for these electric power and coal use requirements for all the demand regions in the United States. Mining, transportation, and air quality control costs are among the costs considered. The model can make decisions to switch among alternative energy sources, to keep old plants operating or to build new ones, and to change the distribution between base, intermediate, and peak load plants. There is no distinction in the model between Federal and non-Federal coal reserves; essentially all reserves are considered available for production.

The assumption that all western reserves are available provides a benchmark production level against which production levels under different policies can be compared. Thus, the impact of a no leasing policy is shown by comparing production levels likely if all coal reserves are assumed available with production levels likely if currently unleased Federal coal is assumed not available. This use of a with-and-without leasing comparison is similar to the with-and-without techniques commonly employed in benefit-cost studies.

Certain of the assumptions specified by DOE in June 1978 will require revision in making future coal production projections, for example, with respect to predictions of national energy legislation that had to be made before it was actually passed. In addition, assumptions are modified and model refinements are made regularly to improve the predictive accuracy of the DOE projection model. New computer runs thus would show some differences compared with those obtained by DOE. However, the range provided by the use of low, medium, and high projections covers any likely outcome under the changed circumstances and model refinements since June 1978.

Table 2-16 shows the DOE national coal consumption projections for 1985 and 1990, broken down by types of use. Under assumptions of medium use, consumption of coal by utilities is projected to rise by 60 percent between 1977 and 1985, from 475 to 760 million tons a year. The other main increase in coal consumption is in the industrial sector, where coal use is projected to grow by 99 million tons, from 60 million tons in 1977 to 159 million tons in 1985.

Total coal consumption for 1985 is projected to be 1.11 billion tons under medium level assumptions. This is a decline of about 150 million tons per year from the projected 1985 production level under the National Energy Plan, reflecting reduced projections especially for industrial coal use.

The medium level increase in national coal production projected between 1985 and 1990 is 37 percent. Most of this increase is due to greater use of coal by utilities. Industrial coal use has a more rapid rate of growth, but the increase is considerably less in absolute amount.

The projections for synthetic uses of coal assign them a minor role in 1985 (23 million tons). By 1990, synthetics are projected to grow by two and one-half times, but would still not be major uses of coal.

Table 2-17 shows the regional breakdown of total coal production projected by DOE. By 1985, coal production west of the Mississippi River is

TABLE 2-16

DOE NATIONAL COAL CONSUMPTION
(million tons)

CONSUMING SECTOR	1977	1985			1990		
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Electric Utility	475	692.4	759.5	816.1	772.4	1,007.1	1,276.7
Industrial	60	109.1	158.7	158.1	138.2	279.4	279.3
Metallurgical	77	96.1	96.2	96.2	100.0	100.0	100.1
Residential/Commercial	7	1.5	1.5	1.5	0.7	0.7	0.7
Synthetics	--	13.1	22.5	41.3	26.3	56.2	122.1
Exports	54	72.5	73.7	73.6	76.3	77.2	77.1
Total	673	984.7	1,112.1	1,186.8	1,113.9	1,520.6	1,856.0

Source: Reference Number 13.

TABLE 2-17

DOE DETAILED REGIONAL COAL PRODUCTION FORECASTS
(million tons)

AREA	1977	1985			1990		
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Northern Appalachian	173.0	208.6	213.0	223.4	194.0	225.3	253.3
Central Appalachian	195.5	196.9	205.2	209.7	188.4	206.2	211.6
Southern Appalachian	21.2	21.4	21.4	21.4	13.8	13.8	13.8
Total	389.7	426.9	439.6	454.5	396.2	445.3	478.7
Midwest	132.7	182.7	204.4	213.4	264.2	312.3	327.3
Total	132.7	182.7	204.4	213.4	264.2	312.3	327.3
E.Northern Great Plains	12.5	20.3	21.9	25.3	23.8	22.5	36.4
W.Northern Great Plains	73.9	223.4	305.6	348.9	267.7	529.0	763.7
Total	86.4	243.7	327.5	374.2	291.5	551.5	800.1
Central West	13.7	8.9	10.6	10.9	9.6	10.3	9.6
Gulf	16.8	57.7	57.7	57.7	62.3	79.6	104.1
Rocky Mountains	20.7	38.8	43.8	44.6	43.7	53.3	53.1
Southwest	22.7	25.8	28.3	28.5	39.9	65.0	79.9
Northwest	5.0	5.6	4.4	4.4	7.0	3.7	3.7
Total	78.9	136.8	144.8	146.1	162.5	211.9	250.4
TOTAL	687.7	990.1	1,116.3	1,188.2	1,114.4	1,521.0	1,856.5

Source: Reference Number 13.

projected to reach 42 percent of the national total (medium assumptions). By 1990, projected western production would reach 50 percent of the national total, corresponding roughly to the percentage of reserves located in the West.

The Northern Great Plains (essentially Wyoming, Montana, and North Dakota in the DOE model) would become the largest single producing section of the country if the DOE projections are realized. By 1990, Northern Great Plains coal production would exceed both Appalachian and Midwestern production and would constitute 36 percent of national production. By comparison, in 1977 production from the Northern Great Plains was 13 percent of national production, much higher than only a few years earlier.

In Table 2-18, DOE projections are shown for the western coal regions selected for assessment in this environmental impact statement. As might be expected, considering its huge reserves of low sulfur coal obtainable at low cost by surface mining, the Powder River Coal Region plays a central role in predicted western coal production. DOE projects coal production in the Powder River Coal Region to be 205 million tons per year in 1985 and 396 million tons per year in 1990 under its medium projection. These amounts represent 43 and 52 percent of total western coal production projected for those years, and 18 and 26 percent of national production.

Other major producing regions after the Powder River Coal Region are the Green River-Hams Fork and San Juan River Coal Regions. Assuming medium consumption levels, production of 112 million tons a year in 1985 and 150 million tons a year in 1990 is projected for the Green River-Hams Fork Coal Region, or 24 and 20 percent of total western production projected for those years. The San Juan River Coal Region is projected to have production of 23 million tons per year in 1985 and 58 million tons per year in 1990, or five and eight percent of western production, respectively.

Although not shown in Table 2-18, the great majority of the coal production projected by DOE is expected to be surface mined. In the Fort Union and Powder River Coal Regions, all the coal production is expected to be surface mined, except possibly for some limited production in the Bull Mountains in Montana. Underground mining represents a major share of projected production only in the Uinta-Southwestern Utah Coal Region (85-90 percent). Of overall western coal production projected for 1985 and 1990, only 6.9 percent and 5.9 percent, respectively, are forecasted by DOE to be mined underground. This low forecast reflects the relatively lower costs of surface mining and the presence in a number of western coal regions of abundant surface minable reserves having low overburden and high seam thickness.

The development of western coal has been stimulated by the greater ease with which low sulfur coal can meet air quality standards, creating a demand in the East for western coal. However, the most important sources of increased demand for western coal are in the West itself. In time, the West is expected to move from its traditional reliance on oil, gas, and hydropower to a new use of coal-fired plants for its electric power. In Table 2-19, the DOE projected transportation of western-produced coal to eastern and western consumption regions is shown. Overall, both for 1985 and 1990 medium forecasts, 18 percent of western production is projected to be consumed in the East and Midwest. While this is not a high percentage, substantial amounts of coal would nevertheless still be shipped east. Under DOE's 1990 high assumptions, which involve low transportation costs, less strict sulfur scrubbing requirements, higher labor costs, and other assumptions designed to promote western production, 299 million tons per year of western coal would move to the East. Table 2-20 provides a detailed breakdown of projected coal flows for the 1990 medium case.

A certain amount of electric power and synthetics production would take place in western producing regions and then be shipped to consuming regions in the East. The consumption of western coal in the East shown in Tables 2-19 and 2-20 thus does not exhaust the use of western coal for eastern energy supply purposes. Similarly, some coal produced in the East will be used to meet western energy consumption needs. The great majority of western production, however, is used to meet western energy needs.

The traditional modeling of the energy sector of the economy, as reflected in the DOE coal model, relates energy use to macroeconomic variables such as income. A new alternative approach currently is being employed in California that projects energy consumption based on a detailed survey of households, businesses, and institutions. To complete the comprehensive inven-

TABLE 2-18

DOE PRODUCTION PROJECTIONS FOR WESTERN COAL REGIONS
(million tons)

COAL REGION	1985 PROJECTION			1990 PROJECTION		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Western Interior	8.9	10.6	10.9	9.6	10.3	9.6
Fort Union	18.4	20.0	23.4	21.9	20.6	34.5
Powder River	140.4	204.6	232.1	173.7	396.1	602.9
Green River-Hams Fork	89.9	112.0	128.8	105.9	149.5	177.7
Uinta-Southwestern Utah	25.7	26.4	26.3	25.1	28.3	27.9
San Juan River	20.1	22.8	22.9	34.5	58.4	72.5
Denver Raton Mesa	5.3	5.3	5.2	5.4	6.8	6.6
Texas	57.7	57.7	57.7	62.3	79.6	104.1
Total[a]	366.4	459.4	507.3	438.4	749.6	1035.8

[a]Excludes production from Arizona, Washington, and Alaska.

Note: The DOE estimates have been revised slightly for purposes of this table.

Source: Reference Number 13.

TABLE 2-19

EASTERN AND WESTERN CONSUMPTION OF WESTERN COAL
(million tons)

	1985			1990		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Western Coal Consumed in the East	74.0	87.3	93.0	75.6	136.0	299.0
Western Coal Consumed in the West	306.4	384.7	426.9	378.2	627.3	750.4
Total Western Coal	380.4	472.0	519.9	453.8	763.3	1049.4

Source: Reference Number 13.

TABLE 2-20

1990 DOE MID-LEVEL
REGIONAL COAL FLOWS
PRODUCTION AND CONSUMPTION

(millions of tons)

PRODUCERS	CONSUMERS															
	NORTHERN APPALACHIAN	CENTRAL APPALACHIAN	SOUTHERN APPALACHIAN	EASTERN INTERIOR	WESTERN INTERIOR	TEXAS GULF	POWDER RIVER	FORT UNION	GREEN RIVER/ HAMS FORK	UINTA-S.W. UTAH	DENVER/ RATON MESA	SAN JUAN RIVER	EAST OTHER	WEST OTHER	EXPORTS	TOTAL
Northern Appalachian	104.5	27.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.8	0.0	31.6	222.3
Central Appalachian	60.5	29.7	11.9	4.5	2.1	0.4	0.0	0.0	0.0	0.0	0.8	0.0	44.8	0.0	50.8	205.5
Southern Appalachian	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	1.8	14.5
Eastern Interior	30.0	20.0	74.5	105.1	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.2	0.0	0.4	312.5
Western Interior	0.0	0.0	0.0	0.1	3.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	10.1
Texas Gulf	0.0	0.0	0.0	0.0	0.0	79.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.6
Powder River	0.1	34.9	23.6	24.9	50.9	111.2	27.6	19.4	9.5	7.3	0.2	3.7	33.9	48.9	0.0	396.1
Fort Union	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	0.0	0.0	0.0	0.0	2.4	0.0	0.0	22.5
Green River/ Hams Fork	0.0	0.0	0.0	7.2	85.0	21.5	0.0	0.0	0.1	2.0	22.7	1.7	0.0	9.3	0.0	149.5
Uinta-South-western Utah	0.0	0.0	0.0	15.9	0.0	0.0	0.0	0.0	0.3	9.2	0.0	0.3	0.0	2.6	0.0	28.3
Denver-Raton Mesa	0.0	0.0	0.0	0.0	0.1	1.5	0.0	0.0	0.0	0.0	3.5	0.0	0.0	2.4	0.0	7.5
San Juan River	0.0	0.0	0.0	0.0	0.0	35.6	0.0	0.0	0.1	1.6	1.5	5.8	0.0	13.1	0.0	57.7
East Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
West Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.1	0.2	1.9	0.0	4.0	0.0	8.3
Total	195.1	112.0	118.7	157.7	172.0	251.8	27.6	39.5	10.1	22.2	28.9	13.4	196.7	80.3	89.0	1514.4

tory on a nationwide basis with the survey method used in California would take considerable time and resources. But the preferred coal management program designed by the Interior Department contains a biennial examination of projections. If it should prove desirable, it will be possible for the Federal government to undertake the kind of end use modeling carried out in California or other alternatives to the DOE methods used for the current projections.

2.7 WESTERN COAL SUPPLY SOURCES

The DOE forecasts of future coal production were based on the assumption that Federal and non-Federal coal reserves would be fully available to meet demands for western coal. The forecasts did not address the questions of which particular reserves might be developed, and whether they were already producing or were likely to be able to enter into production.

2.7.1 Production Potential of Federal Coal

Future production of Federal coal reserves can come either from already issued Federal leases or from new leases. There are currently 534 outstanding Federal coal leases which are estimated to contain 17 billion tons of recoverable reserves (see Table 2-21). Sixty-seven percent of existing lease reserves are surface minable. The Powder River Coal Region contains 58 percent of existing lease reserves, most of which are surface minable and are located in the Wyoming part of the region. Leased surface minable reserves in the Powder River Coal Region represent 82 percent of all surface minable reserves in existing Federal leases. The Uinta-Southwestern Utah Coal Region has the second largest amount of reserves in existing leases, 4.5 billion tons. Sixty-nine percent of these reserves are underground reserves located in the Utah part of the region. The Powder River and Uinta-Southwestern Utah Coal Regions together account for 84 percent of existing lease reserves.

Estimates of recoverable reserves from existing leases were made by U.S. Geological Survey (USGS) mining supervisors (75 percent of lease reserves), by USGS area or district geologists (eight percent), by the lessees (eight percent), or by unspecified parties (four percent). The General Accounting Office has criticized the Interior Department's lease reserve estimates as not sufficiently accurate, particularly on an individual lease basis [16]. The Department is currently undertaking to improve the accuracy of reserve information, and plans to request lessees to provide new reserve data in order to bring reserve estimates into conformance with the standards for reserves in GS Bulletin 1450B [17].

By 1977, annual production from existing Federal leases reached 51.9 million tons. Substantial further increases in production can be expected from these leases by 1986, both from leases already included in mine plans and from leases which are not currently included in mine plans. After 1986, further expansions in production of Federal coal would have to come either through greater production from already operating mines containing Federal coal or through new Federal leasing. If existing leases issued prior to 1976 are not in production by 1986, under current regulations they would be subject to cancellation for failure to meet diligent development requirements. The Department at present expects that the great majority, if not all, such existing leases would be cancelled if they are not producing by 1986. A few exceptions would be possible to complete work on an advanced technology process, to develop a very large mine, or where there is a firm contract to buy the coal later on (see discussion of diligence requirements for existing leases in Section 3.2.10 and Appendix I).

2.7.1.1 Planned Production from Existing Leases with Mine Plans. As of June 1978, the Department had received 119 mine plans that were approved or were pending approval. The 223 Federal leases included in these mine plans contain 9.3 billion tons of recoverable reserves, representing 54 percent of the reserves in all existing Federal leases. In 1977, production from mines including Federal leases was 96.3 million tons, representing 82 percent of total 1977 coal production in the six western Federal coal states. Only a little more than half of this production represented Federal coal, since a number of the mines also include non-Federal coal. Federal coal is expected to constitute a much larger share of future planned production from mines including Federal leases.

In Table 2-22, planned production from approved and pending mine plans containing Federal leases is shown. These planned production estimates were reported in March 1978 by the U.S. Geological Survey on the basis of lessee an-

TABLE 2-21

RECOVERABLE COAL RESERVES IN EXISTING FEDERAL LEASES (b)

COAL REGION	NUMBER OF LEASES	ACREAGE LEASED	RECOVERABLE SURFACE RESERVES (million tons)	RECOVERABLE UNDERGROUND RESERVES (million tons)	TOTAL RECOVERABLE RESERVES (million tons)
Fort Union					
North Dakota	17	15,515	(a)	0.0	(a)
Montana	3	6,056	(a)	0.0	(a)
Total	20	21,571	540.0	0.0	540.0
Powder River					
Montana	13	30,161	(a)	(a)	993.8
Wyoming	56	132,202	(a)	(a)	8,888.3
Total	69	162,363	9,471.2	410.9	9,882.1
Green River-Hams Fork					
Wyoming	38	82,452	374.6	547.7	922.3
Colorado	34	33,946	289.8	198.3	488.1
Total	72	116,398	664.4	746.0	1,410.4
Uinta-Southwestern Utah					
Utah	199	271,326	267.0	3,089.3	3,356.3
Colorado	67	73,790	168.9	971.6	1,140.5
Total	266	345,116	435.9	4,060.9	4,496.8
San Juan River					
New Mexico	25	40,757	273.1	(a)	(a)
Colorado	7	10,242	0.0	(a)	(a)
Total	32	50,999	273.1	127.5	400.6
Denver-Raton Mesa					
Colorado	6	3,686	25.6	(a)	(a)
New Mexico	3	201	0.0	(a)	(a)
Total	9	3,887	25.6	22.8	48.4
Other Regions	66	90,482	74.2	235.6	309.8
GRAND TOTAL	534	790,816	11,484.4	5,603.7	17,088.1

(a) Cannot be disclosed because of confidentiality requirements.
(b) Includes leases issued prior to March, 1978.

TABLE 2-22

PLANNED 1985 PRODUCTION FROM APPROVED AND PENDING MINE PLANS CONTAINING FEDERAL LEASES (a)

COAL REGION	NUMBER OF LEASES IN MINE PLANS	RECOVERABLE FEDERAL RESERVES IN MINE PLANS (million tons)	1978 PRODUCTION[d]	1985 PLANNED PRODUCTION (million tons/year)
Fort Union	4	(b)	10.2	5.9
Powder River	35	6,025	71.5	201.5
Green River-Hams Fork	49	1,148	18.5	42.9
Uinta-Southwestern Utah	114	1,859	14.0	43.3
San Juan River	8	98	8.3	10.5
Denver-Raton Mesa	1	(b)	0	0.002
Other Regions	12	54	4.3	4.5
Total	223	9,306[c]	126.8	308.6

(a) Estimates based on March 1978 Department of the Interior review of existing Federal leases, and lessee announced plans.
(b) Cannot be disclosed because of confidentiality requirements.
(c) Includes total recoverable reserve in mine plans in Fort Union and Denver-Raton Mesa Coal Regions.
(d) Production estimated made during 1978.

nounced plans, submitted mine plans, discussions with lessees, and other information. The total production planned for 1985 from mines including Federal leases is 308.6 million tons. Almost two-thirds of the planned production is expected from the Powder River Coal Region, which is consistent with the large supply of low cost, surface minable reserves in existing leases in this region. Although not shown in Table 2-22, 82 percent of the total production planned in the Powder River Coal Region would come from Wyoming and only 18 percent from Montana.

The production planned for approved and pending mine plans may not all occur. The most important potential constraint is lack of demand; the coal would only be produced if there is a market for it. Some pending mine plans may never be approved (for example, they could be located in an alluvial valley, or require a new transportation system with unacceptable environmental impacts). Planned production may also not materialize if other coal proves to be cheaper to mine or higher in quality. Nevertheless, total production planned from approved and pending mine plans provides a good indication of the production potential of these mines.

2.7.1.2 Likely Production from Existing Leases Without Mine Plans. In addition to the 223 Federal leases included in mine plans, there are an additional 311 Federal leases, representing 46 percent of existing Federal reserves under lease, for which no mine plans have been submitted to the Department. In order to obtain an estimate of the production potential of these leases, the U.S. Geological Survey was requested as part of the Department's coal policy review to give its best judgment as to whether such leases were "more likely than not" to be in production by 1986 in time to meet diligent development standards. These judgments were made in March 1978 by USGS mining supervisors, taking into account demand for the coal type, environmental problems of the lease site, transportation availability, mining costs, lease size, and other factors. Of the 7.8 billion tons of total reserves in existing leases without mine plans, the USGS estimated that leases containing 1.7 billion tons of reserves would likely be in production by 1986 and leases containing 6.1 billion tons of reserves would not likely be in production by 1986. Reserves in leases believed likely to be producing by 1986 would be sufficient to sustain an annual production rate of 57.3 million tons a year. Leases containing other reserves would be subject to cancellation in 1986 for failure to be diligently developed.

In Table 2-23 the likely regional production from Federal reserves under lease which are not now in mine plans but which are considered likely to be producing by 1986 is shown. The Uinta-Southwestern Utah Coal Region has the largest share, 41 percent of likely production. In other regions, there is only a small amount of likely production from Federal leases beyond that expected from already approved or pending mine plans.

There are many possible reasons why an existing Federal lease might not be put into production by 1986. Many of the leases are small and would require additional Federal leasing or acquisition of other coal rights to form economically viable, or logical, mining units. Others are located far from transportation routes or are in areas with environmental problems. Coal quality is poor and prospective mining costs high in some cases, and there may not be a sufficient demand for the types of coal contained in some leases.

In the Uinta-Southwestern Utah Coal Region, for example, existing leases contain 4.5 billion tons of reserves, most of them for underground mining. These reserves would be sufficient to sustain mines with an annual production rate of 150 million tons per year. However, the DOE 1985 medium production projection for the Uinta-Southwestern Utah Coal Region is only 26.4 million tons (see Table 2-18), some of which would be provided by non-Federal coal. Even if the DOE projections are low, a large part of the reserves in the existing Federal leases in the Uinta-Southwestern Utah Coal Region have very little chance of entering into production by 1986. These nonproducing reserves are likely to be the reserves with higher mining costs, more distant from transportation routes, and with other problems.

Similarly, in the Powder River Coal Region, the one other region with major reserve holdings in existing Federal leases, the 9.5 billion tons of surface minable reserves in existing leases could sustain production of 317 million tons per year. The DOE medium projection for this region in 1985, however, is only 205 million tons and even the high projection is only 232 million tons. The

TABLE 2-23

LIKELY 1985 PRODUCTION FROM EXISTING FEDERAL LEASES WITHOUT MINE PLANS[a]

COAL REGION	NUMBER OF LEASES WITHOUT MINE PLANS	RECOVERABLE RESERVES IN FEDERAL LEASES WITHOUT MINE PLANS (million tons)	RECOVERABLE RESERVES IN LEASES WITHOUT MINE PLANS LIKELY TO BE PRODUCING IN 1985 (million tons)	LIKELY PRODUCTION IN 1985 FROM LEASES WITHOUT MINE PLANS[d] (million tons/year)
Fort Union	16	(b)	(b)	(b)
Powder River	34	3,857	210	7.0
Green River-Hams Fork	23	262	204	6.8
Unita-Southwestern Utah	152	2,638	700	23.3
San Juan River	24	303	254	8.5
Denver-Raton Mesa	8	(b)	(b)	(b)
Other Regions	54	256	46	1.5
Total	311	7,782(c)	1,718(c)	57.3

(a) Estimates based on March 1978 Department of the Interior review of existing Federal leases.
(b) Cannot be disclosed because of confidentiality requirements
(c) Includes total recoverable reserves in mine plans in Fort Union and Denver-Raton Mesa Coal Regions.
(d) Assumes 30 year mine life.

low 1985 projection is 140 million tons. Hence, a significant amount of existing lease reserves in the Powder River Region also are unlikely to be producing in time to meet the 1986 diligence standard. Nonproducing reserves here would also generally be the ones which are of relatively lower quality, mostly located in Wyoming, where the largest uncommitted reserves are found.

2.7.1.3 Preference Right Lease Applications. Another important potential source of Federal coal production is contained in preference right lease applications (PRLAs). Until preference right leasing was ended administratively in the early 1970's (and statutorily by the Federal Coal Leasing Amendments Act of 1976), the government issued prospecting permits in areas where coal was not known to exist in economically valuable deposits. A holder of a prospecting permit discovering a high quality deposit could apply for and obtain a lease to mine the deposit by demonstrating that it contained commercially valuable coal. Such leases were called preference right leases and were issued on a noncompetitive basis. There are currently 172 outstanding applications for preference right leases remaining from prospecting permits issued mostly in the late 1960's and early 1970's (see Table 2-24).

Total recoverable reserves in PRLAs are 9.9 billion tons, 3.5 billion surface minable and 6.4 billion minable by underground methods. Sixty percent of PRLA reserves are located in the Powder River Coal Region, all in the Wyoming part. Seventy-three percent of Powder River Coal Region PRLA reserves are underground reserves. The Uinta-Southwestern Utah and San Juan River Coal Regions each contain more than one billion tons of PRLA reserves. The Uinta reserves are mostly suitable for underground mining, whereas 55 percent of the San Juan River reserves are recoverable by surface mining methods.

Some PRLA holders may be unable to obtain leases because they have failed to meet all the legal requirements for processing their applications. Initial showings for some PRLAs were never made, or were made after the legal deadline had passed. Other PRLAs were improperly filed including areas containing prior mining claims. PRLAs also may have little development potential because they are located in areas where coal development is now considered environmentally questionable and where the Department would want to exchange for or purchase any leases which PRLA holders are rightfully due.

As part of the Department's coal policy review, all PRLAs were examined to assess compliance with filing deadlines and other legal requirements and to assess potential environmental problems. Table 2-25 shows PRLA production potential, after excluding PRLAs for which there are legal uncertainties and PRLAs in areas that are considered environmentally questionable.

Total PRLA production potential would be 251 million tons per year. However, 63 percent of this production potential is for underground mining, which has limited prospects in the next decade except in the Uinta-Southwestern Utah Coal Region. Forty-four percent of total PRLA reserves and 57 percent of PRLA reserves without legal or environmental questions are underground reserves located in the Powder River Coal Region, where DOE projections show no underground mining occurring. There are also doubts as to the desirability or feasibility of production from many PRLA surface reserves. PRLAs in many cases are located outside the areas of highest coal development potential, because the Federal government originally issued prospecting permits, which have ripened into PRLAs, only in areas which were outside the known prime coal locations. There also was little attention given to environmental considerations in the issuing of prospecting permits.

2.7.2 Coal Owned by Indian Tribes[1]

Indian owned coal reserves in the West are estimated to be 70 billion tons, 30 billion of which are surface minable. These reserves constitute the largest contiguous blocks of non-Federal coal and are a very important potential source of supply for future western coal production. Coal production from Indian lands was 22.9 million tons in 1977, 13.8 percent of total western production. The largest amount of Indian coal production in 1977 took place in Arizona, 11.5 million tons. Indian coal production was 11.4 million tons in the six western Federal coal states; 6.9 million tons in New Mexico, and 4.5 million tons in Montana.

[1]Indian coal is considered "non-Federal" coal in this environmental impact statement. This coal would not be governed by the Department's coal management program. Rather, the Department, through the Bureau of Indian Affairs, exercises trust responsibility over coal development on Indian reservations.

TABLE 2-24

OUTSTANDING PREFERENCE RIGHT LEASE APPLICATIONS

COAL REGION	NUMBER OF APPLICATIONS	APPLICATION ACREAGE	RECOVERABLE SURFACE RESERVES (million tons)	RECOVERABLE UNDERGROUND RESERVES (million tons)	TOTAL RECOVERABLE RESERVES (million tons)
Fort Union					
North Dakota	0	0	0.0	0.0	0.0
Montana	4	14,673	(a)	(a)	(a)
Total	4	14,673	(a)	(a)	(a)
Powder River					
Montana	0	0	0.0	0.0	0.0
Wyoming	60	96,149	1,604.3	4,308.3(d)	5,912.6
Total	60	96,149	1,604.3	4,308.3	5,912.6
Green River-Hams Fork					
Wyoming	14	43,401	(a)	100.5	(a)
Colorado	5	9,130	(a)	25.0	(a)
Total	19	52,531	25.2	125.5	150.7
Uinta-Southwestern Utah					
Utah	25	75,591	85.7	989.4	1,075.1
Colorado	10	28,205	22.2	166.8	189.0
Total	35	103,796	107.9	1,156.2	1,264.1
San Juan River					
New Mexico	28	77,590	(a)	(a)	(a)
Colorado	2	3,457	(a)	(a)	(a)
Total	30	81,047	824.3	680.0	1,504.3
Denver-Raton Mesa					
Colorado	20	42,118	670.5	80.6	751.1
New Mexico	0	0	0.0	0.0	0.0
Total	20	42,118	670.5	80.6	751.1
Other Regions	4	5,954	(a)	(a)	(a)
GRAND TOTAL (c)	172	396,268	3,540.2(b)	6,366.4(b)	9,906.6(b)

(a) Cannot be disclosed because of confidentiality.
(b) Includes Fort Union and Other Regions reserves.
(c) Does not include four Alaska PRLAs.
(d) Main potential for use at present is coal gasification.

TABLE 2-25

PRODUCTION POTENTIAL FROM OUTSTANDING PREFERENCE RIGHT LEASE APPLICATIONS [c]

(million tons)

COAL REGION	TOTAL PRLA RECOVERABLE RESERVES		RECOVERABLE RESERVES WITHOUT LEGAL QUESTIONS (d)		RECOVERABLE RESERVES WITHOUT LEGAL OR ENVIRONMENTAL QUESTIONS (e)		ANNUAL PRODUCTION POTENTIAL (f)	
	SURFACE	DEEP	SURFACE	DEEP	SURFACE	DEEP	SURFACE	DEEP
Fort Union	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Powder River	1,604.3	4,308.3	1,604.3	4,308.3	1,454.0	4,308.3	48.5	143.6
Green River-Hams Fork	25.2	125.5	25.2	125.5	8.1	19.3	0.3	0.6
Uinta-Southwestern Utah	107.9	1,156.2	107.9	373.0	55.4	340.7	1.8	11.4
San Juan River	824.3	680.0	361.6	52.0	337.8	50.5	11.3	1.7
Denver-Raton Mesa	670.5	80.6	670.5	80.6	549.4	78.4	18.3	2.6
Other Regions	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
TOTAL	3,540.2[b]	6,366.4[b]	3,077.5[b]	4,955.2[b]	2,712.7[b]	4,813.0[b]	90.4[b]	160.4[b]

(a) Cannot be disclosed because of confidentiality requirements.
(b) Includes Fort Union and Other Regions.
(c) Estimates based on 1978 Department review of Preference Right Lease Applications.
(d) Eliminates reserves under applications which have not met Department procedural or legal requirements -- initial showings not made, or filed past deadline, or the PRLA was filed for land already subject to a mining claim.
(e) Eliminates both PRLA reserves with legal problems and reserves which lie in areas judged by Department personnel to be environmentally questionable for mining.
(f) Based on estimates of reserves without legal or environmental questions. Assumes a 30-year mine life.

The most important Indian coal owners are the Crow and Cheyenne Tribes in the Powder River Coal Region in Montana, the Navaho Tribe in the San Juan River Coal Region, and the Three Affiliated Tribes in the Fort Union Coal Region. Except for the Cheyenne, these tribes have indicated an interest in developing their coal reserves. Coal development has the potential for generating a major infusion of income for these tribes. At present, development of the Crow coal is being delayed by a legal battle between the tribe and previous purchasers of leases and holders of prospecting permits.

The Cheyenne Tribe is seeking designation of the Cheyenne Reservation as a Class I air quality area. Such a designation would probably prevent any further construction of power plants in the areas within or immediately adjacent to the reservation. Because of fugitive dust problems, coal mining could also be affected.

In Table 2-26, approximate estimates of surface minable reserves owned by Indian tribes are shown including estimates of reserves not yet fully delineated. The 1977 production level, 1985 planned production from existing and proposed mines, and maximum production potential on Indian lands are also shown. Planned production for 1985 from Indian lands in the six western Federal coal states is 25 million tons. Maximum production potential would be more than 800 million tons per year. However, it would be extremely unlikely that anything like full maximum potential production would occur at any one time.

2.7.3 Non-Federal, Non-Indian Coal

In addition to coal owned by Indian tribes, there are other substantial holdings of non-Federal coal in the West. The states have large reserve holdings, although typically scattered in isolated state sections. Railroads retain large holdings of coal in checkerboard areas which were originally railroad land grants. The Federal Government did not make it a general practice to retain coal rights in its land disposals until the early twentieth century, resulting in large-scale transfers of coal ownership to the private sector in earlier years. In Table 2-27, estimated non-Federal coal reserves and the percentage of total reserves they represent (excluding Indian coal) are shown for the western coal regions. In the six regions shown, which include 91 percent of western coal reserves, non-Federal reserves are 28 percent of total reserves.

State governments have made large amounts of coal available for development through state leasing. States have issued 2,553 outstanding coal leases for 2.2 million acres of land, almost three times the Federal acreage currently under lease (see Table 2-28). The State of Wyoming has issued the largest number of leases for more than one million acres of state-owned coal. Little production has thus far come from state leases (see Table 2-28), partly due to their small sizes and scattered locations. State leases are most likely to be developed in the future when state coal is located amidst or adjacent to Federal or private coal that is being developed.

Although there are substantial non-Federal reserves, the development potential of these reserves generally is limited by the highly fragmented coal ownership pattern in the West. In checkerboard areas, for example, development would have to proceed one section at a time if the intervening Federal sections were not available. This would impose a high economic cost and would also have undesirable environmental consequences. Therefore, non-Federal coal in checkerboard areas would have a poor development potential without the addition of Federal coal (and vice-versa).

In order to assess the development potential of non-Federal reserves by themselves, these reserves were classified according to three categories: (1) blocks of non-Federal coal possibly large enough by themselves to support a viable mining operation (with the minimum cutoff size set at 2,560 acres); (2) non-Federal coal in checkerboard areas and probably not developable alone; and (3) non-Federal coal in scattered parcels probably too small to support a viable mining operation (less than 2,560 acres). The estimated distribution of non-Federal reserves among these three categories is shown in Table 2-29. Checkerboard areas alone contain more than one-third of all non-Federal reserves. In total, 55 percent of all non-Federal reserves are in fragmented parcels too small to be developed by themselves.

The coal regions with the highest percentages of non-Federal reserves in large contiguous blocks are the Fort Union, Green River - Hams Fork, and Denver-Raton Mesa Coal Regions. The Uinta-Southwestern Utah and the Powder River Coal

TABLE 2-26

INDIAN COAL RESERVES AND PRODUCTION PLANS, SIX WESTERN FEDERAL COAL STATES

COAL REGION	SURFACE MINABLE RESERVES[a] (million tons)	1977 PRODUCTION	1985 PLANNED PRODUCTION FROM EXISTING AND PLANNED MINES[b] (million tons/year)	MAXIMUM ANNUAL PRODUCTION POTENTIAL (millions of tons)[c]
Fort Union[d]	3,000	0	0	100
Powder River[e]	15,000	4.5	14.0	500
San Juan River[f]	4,000	6.9	11.1	133
Other Indian holdings[g]	5,000-7,000	0	0	166-233

(a) Recoverable reserve estimates based on Bureau of Indian Affairs Minerals Inventory Reports.
(b) Based on DOE Leasing Policy Development Office projections of production in 1985 (Reference Number 13).
(c) Assumes 30-year mine life.
(d) Coal owned by Three Affiliated Tribes.
(e) Coal owned by Crow and Cheyenne Tribes.
(f) Coal owned by Navaho Tribe, includes only New Mexico reserves. The Navaho also owns another 1 billion tons of surface reserves in Arizona.
(g) Includes coal owned by Southern Ute, Ute Mountain, Jicarilla, Flathead, and Blackfeet tribes.

TABLE 2-27

ESTIMATED NON-FEDERAL RESERVES

COAL REGION	NON-FEDERAL RESERVES AS PERCENT OF ALL RESERVES[a]	ESTIMATED NON-FEDERAL RESERVES (million tons)[b]	MAXIMUM ANNUAL PRODUCTION POTENTIAL (millions of tons)[c]
Fort Union	61%	14,092	470
Powder River	20	28,505	950
Green River-Hams Fork	44	6,839	228
Uinta - Southwestern Utah	17	1,014	34
San Juan River	23	958	32
Denver-Raton Mesa	82	3,169	106
Total	28	54,577	1,820

(a) Breakdown between Federal and non-Federal ownership made by examination of coal ownership rights in the six regions. Reserves are assumed to be distributed between Federal and non-Federal ownership in direct proportion to the acreages of Federal and non-Federal subsurface coal ownership within Known Recoverable Coal Resource Areas (KRCRAs) located in each region. Estimates were made under 1978 Interior Department coal policy review study of coal ownership, as shown on BLM surface-subsurface minerals ownership maps ("color quads"). Data do not include Indian-owned coal not in KRCRAs.

(b) Estimates based on Bureau of Mines reserve figures (see Table 2-1) (Reference numbers 2, 3).

(c) Assumes 30-year mine life.

TABLE 2-28

STATE COAL LEASES

STATE	LEASES (No.)	ACREAGE LEASED (Acres)	1977 PRODUCTION (millions of tons)
Colorado	147	252,199	0.2
Montana	96	51,947	5.1
New Mexico	218	106,860	0
North Dakota	10	3,838	1.3
Utah	514	543,557	0.3
Wyoming	1,568	1,235,229	0.7
TOTAL	2,553	2,193,630	7.6

Source: Reference Number 14.

TABLE 2-29

ESTIMATED DISTRIBUTION OF NON-FEDERAL RESERVES
BY OWNERSHIP CATEGORIES (a)

(percent)

COAL REGION	SOLID NON-FEDERAL RESERVES (POSSIBLY DEVELOPABLE) (b)	NON-FEDERAL RESERVES IN CHECKERBOARD	NON-FEDERAL RESERVES IN SCATTERED SMALL BLOCKS (c)	FEDERAL RESERVES
Fort Union	37.8%	21.6%	1.7%	39%
Powder River	6.8	7.9	5.5	79.8
Green River-Hams Fork	23.3	13.4	7.0	56.3
Uinta-Southwestern Utah	6.9	0	10.1	82.9
San Juan River	14.2	0 (d)	8.5	77.3
Denver-Raton Mesa	62.8	0	19.5	17.8
TOTAL	12.1	9.3	5.6	73.0

(a) Estimates based on the distribution of subsurface coal ownership in Known Recoverable Coal Resource Areas (KRCRAs) in the regions shown.

(b) Solid ownership was defined as reserves under non-Federal ownership in contiguous blocks greater than or equal to 2,560 acres. In Regions 2 and 3, a portion of the reserves are found in areas of checkerboard ownership, within which a number of 5-section blocks (3,200 acres) exist where the center section is state-owned and the surrounding sections are privately owned. These sections may be developable only if the center section (640 acres) is leased by the state to a private owner holding development rights to the reserves in the surrounding sections. In Region 2, at least 55 percent of the total solid non-Federal block is composed of these five-section blocks; in Region 3, at least 34 percent of the total solid non-Federal blocks fall in this category.

(c) Scattered small ownership blocks are defined as isolated sections of non-Federal coal ownership less than 2,560 acres in size, outside checkerboard areas.

(d) Some railroad checkerboard lands are located in San Juan River Region. However, as of March 1978 KRCRAs had not yet been defined for these lands.

Regions have relatively much smaller proportions of non-Federal coal contained in large blocks.

Because of the importance of the Powder River Coal Region in future coal production projections, ownership patterns in this region are particularly significant. In the Wyoming part of the region, the areas along the Wyodak seam which are surface minable and which have the highest coal development potential contain almost entirely Federally-owned coal. Other than Indian coal, the Montana part of the Powder River Coal Region is composed of a large checkerboard area and a large area of Federally-owned coal. Only 6.8 percent of the Powder River Coal Region reserves are non-Federal and appear possibly large enough to be efficiently developed.

Most of the coal included in the "possibly developable" category in Table 2-29 is in fact not likely to be developed in the near future. Much of the non-Federal coal is outside the areas of lowest production costs. A large part is suitable only for underground mining. The alluvial valleys of the West are typically privately owned and contain sizeable non-Federal reserves which it may not be desirable to develop. Non-Federal reserves may also have other environmental problems. Even though non-Federal blocks may be of sufficient size to form a viable mining unit, these blocks may have several different non-Federal owners. There is no assurance that all owners would want their coal developed or that it would be possible to assemble the non-Federal coal into a developable package. Finally, non-Federal coal owners may not be able to gain surface owner consent in those cases where there is a different surface owner and consent is needed under state law.

Planned production from mine plans that included Federal leases was shown earlier in Table 2-22. There are also a number of planned mines which do not involve any Federal coal. In 1977, excluding Indian lands, mines with no Federal coal produced 10.7 million tons, or nine percent of total production in the six western Federal coal states.

In Table 2-30, production planned for 1985 from mines that do not involve any Federal leases is shown for the six western coal regions. Total 1985 production planned from these mines is 35.7 million tons. Forty-five percent of this planned production would occur in the Fort Union Coal Region, where there is extensive non-Federal coal ownership.

2.8 THE NEED FOR NEW FEDERAL COAL LEASING

The Department of the Interior imposed a moratorium on further leasing of Federal coal in 1971 (see Chapter 1). At that time, a Department study indicated that Federal reserves under lease were rising rapidly, while production of Federal coal was remaining at low levels. Most previous acquisitions of Federal leases appeared to have been largely for speculative purposes.

Subsequent efforts by the Department to resume Federal coal leasing, including the decision in 1973 to develop a leasing program and the adoption of a leasing program in 1976, were widely criticized on the grounds that the need to resume Federal leasing had not been demonstrated. The failure of the Department to show the need for leasing was cited by the court in *NRDC v. Hughes* as a principal defect in the previous coal leasing programmatic environmental impact statement. (See Chapter 1 for a more detailed discussion of the recent history of Federal coal leasing.)

Certainly, a Federal coal management program is required to govern a range of coal activities other than competitive leasing: the application of planning and land unsuitability requirements to existing leases; the consideration of preference right lease applications; the processing of lease readjustments, relinquishments, cancellations, terminations, and assignments and other transfers; and the exchange of Federal coal and other mineral leases and lease bidding rights for environmentally unacceptable Federal leases and of Federal coal for alluvial valley floor coal. Competitive leasing would be only one, albeit critically important, component of a Federal coal management program. This component would be implemented only if a resumption of competitive leasing is determined to be necessary.

Resumption of Federal coal leasing would have a number of both beneficial and adverse impacts. If the Secretary of the Interior decides to resume leasing, his decision would reflect a determination that the need for leasing and the associated benefits outweigh the adverse impacts.

Resuming leasing would provide to the Nation four important benefits:

- The most important benefit is that it would give the Nation greater assurance of being able to meet its national energy objectives.

TABLE 2-30

1985 PLANNED PRODUCTION FROM EXISTING AND PLANNED MINING OPERATIONS INVOLVING ONLY NON-FEDERAL, NON INDIAN COAL(a)

REGION	1985 PLANNED PRODUCTION (million tons/year)
Fort Union	15.9
Powder River	3.6
Green River-Hams Fork	6.9
Uinta - Southwestern Utah	3.9
San Juan River	2.4
Denver-Raton Mesa	3.0
Total	35.7

(a) Based on DOE Leasing Policy Development Office compilations of planned mine production in 1985 (Reference Number 13).

- New leasing would also provide a means to promote a more desirable pattern of coal development. It may be possible to lower overall production costs and reduce the adverse environmental impacts resulting from coal mining by altering coal development patterns.
- A resumption of leasing would offer significant legal and administrative advantages for the Department of the Interior.
- Finally, the state of competition in the western coal industry would be improved by new leasing.

These benefits must be weighed against adverse environmental consequences of new leasing which are analyzed in Chapter 5.

2.8.1 Leasing to Meet National Energy Objectives

In leasing to meet national energy objectives, the Department is not leasing to meet today's needs but those many years in the future. Forecasts of future energy demands and supplies are subject to many uncertainties. The uncertainties increase the further in the future the forecast is made. It is difficult to predict how energy users and suppliers would respond to greater energy scarcity, new energy and environmental legislation, and changing energy prices, or to what extent users would adopt conservation measures or be willing to change their previous behavior patterns. Information about current and expected future energy reserves often is not very accurate or reliable. Changes in technology may substantially alter the relative economics of different energy sources. The most important factor determining coal demand, electric power demand, is itself subject to great uncertainty. Changes in government regulations can also cause important shifts in the relative desirability of one energy source compared with another. For these and other reasons, when examining the need for western coal it is important to examine a range of possible demand and supply levels, as was done by the Department of Energy (DOE) in the generation of high, medium, and low western coal production projections.

Consideration of forecasts for a range of future years is also required in energy planning. Thus, in evaluating the need for new Federal leasing, western coal production forecasts for 1985 and 1990 were prepared.

After a lease is issued, it would typically be another one to three years before a mine plan is submitted to the government. A government decision on approval of the plan is likely to take up to another year, and in some cases more. From the point of approval, two to three years would then be required to move a major western surface coal mine into full operation. All told, actual production of coal appears likely to occur four to seven years after the sale is held and a lease is issued.

At each of these steps, the potential coal mine could be found infeasible and have to be abandoned because of environmental, geologic, or economic factors. Thus, not only the uncertainty surrounding future levels of demand, but also the uncertainty of any given tract passing through the steps from potential tract to fully operational mine must be taken into account in assessing leasing needs.

If the decision is made to resume Federal leasing, about one to two years would be required to accomplish the full land use and environmental planning for the first round of lease sales under the preferred program. (Some earlier sales could be held under special start-up procedures and later sales would be able to make use of the planning for the first sales.) Taking into account the time after lease issuance, a decision at this time to hold a lease sale is not likely to result in coal production before 1985 to 1990. The planning horizon for this programmatic environmental impact statement includes decisions on whether or not to lease up to as late as 1985. A decision in 1985 to hold a lease sale is not likely to result in coal production until the early 1990s and possibly as late as 1995. Hence, the time horizon for a current assessment of the need for a resumption of Federal coal leasing extends as far as meeting coal production needs in 1995. DOE did not make production projections beyond 1990 and such distant projections would be subject to many uncertainties. The primary focus in assessing leasing needs is on the year 1990. It is unlikely that Federal leasing decisions following completion of this programmatic environmental impact statement could, or need to, have a major influence on 1985 western coal production levels.

Under current regulations, existing Federal leases issued prior to 1976 and not in production by 1986 would be subject to cancellation for failure to be diligently developed. It is expected that, with

a few possible exceptions (see 43 CFR 3520.2-5), existing leases not producing in 1986 will in fact be cancelled. Hence, increases in production of Federal coal after 1986 would essentially have to come either from new Federal leasing or from expansion of mines containing Federal coal which are already operating by 1986. It is hard to know precisely what the expansion potential of these mines would be, or whether rapid expansion would introduce inefficiences in their operation. But beyond this expansion potential, if Federal coal is to have a role in increases in western coal production after 1986, it would have to be through development of Federal coal that is not now under lease.

In Section 2.7 above, estimates were made of planned and likely western production in 1985 from a number of possible sources. Table 2-31 summarizes these estimates. Total planned production in Table 2-31 includes: (1) planned production from non-Federal, non-Indian mines which do not involve any existing Federal leases; (2) planned production from Federal mine plans currently approved or submitted to the Department; and (3) planned production from mines on Indian lands. Production already planned for 1985 from these sources is 365 million tons. This estimate is reasonably consistent with estimates of 1985 planned production within the six coal regions in Table 2-31 previously compiled by the National Coal Association and DOE's Leasing Policy Development Office. The 1985 planned production estimates obtained by these sources were 420 million tons and 357 million tons, respectively. For comparison, total production in the six coal regions in 1977 was 118 million tons.

As seen in Table 2-31, planned 1985 production is more than the DOE low projection for 1985 of 300 million tons for the six regions located in the six western Federal coal states. On the other hand, planned production is less than the 1985 medium and high production projections of 391 millon tons and 439 million tons, respectively.

The addition of likely 1985 production from existing leases currently without mine plans brings the total for 1985 planned and likely production to 422 million tons, above the medium 1985 DOE projection, although still below the high DOE 1985 projection.

As shown in Table 2-31, achievement of any of the DOE 1985 projected production levels appears unlikely in the Green River-Hams Fork Coal Region. The total of already planned production and likely production from existing leases without mine plans in this region is only half the DOE medium 1985 projected production. As seen in Figure 2-3, the Green River-Hams Fork Coal Region is the only region in which achieving 1985 DOE projected production levels appears to be a substantial problem.

For 1990, which is the more important year than 1985 in assessing the need for new Federal leasing, currently planned production is less than the DOE low, medium, or high projected production levels (see Table 2-32). However, for low 1990 projections, which are actually less than the medium 1985 projections, planned production is just short of projected production. With the addition of likely production from existing Federal leases not now included in mine plans, there would appear to be little difficulty in achieving the DOE low 1990 projected production levels without further Federal leasing if all planned production occurs. As is the case for 1985, there would be major problems in reaching any of the projected production levels in one region, the Green River-Hams Fork Coal Region (See Figure 2-4).

The fact that currently planned and likely production exceeds 1990 low production projections does not resolve the question of the need for new leasing in the low case. Current company production plans are based on demand assumptions that in many cases are undoubtedly more optimistic than the assumptions used by DOE for the low projections. If DOE low assumptions prove accurate, some part of currently planned production would very likely not occur. There would not be enough demand by 1985 to support it, which is the time frame toward which most current plans are oriented. If the planned production does not occur by 1986, plans based on mining of Federal leases would have to be abandoned entirely because of failure to meet diligent development requirements.

Even under low demand assumptions, increases in western coal production would be expected between 1986 and 1990. Significant contributions to this growth in production could not come from Federal coal without new leasing because undeveloped leases would in all likelihood have already been cancelled. In short, the only forecast that leads to a wholly unambiguous

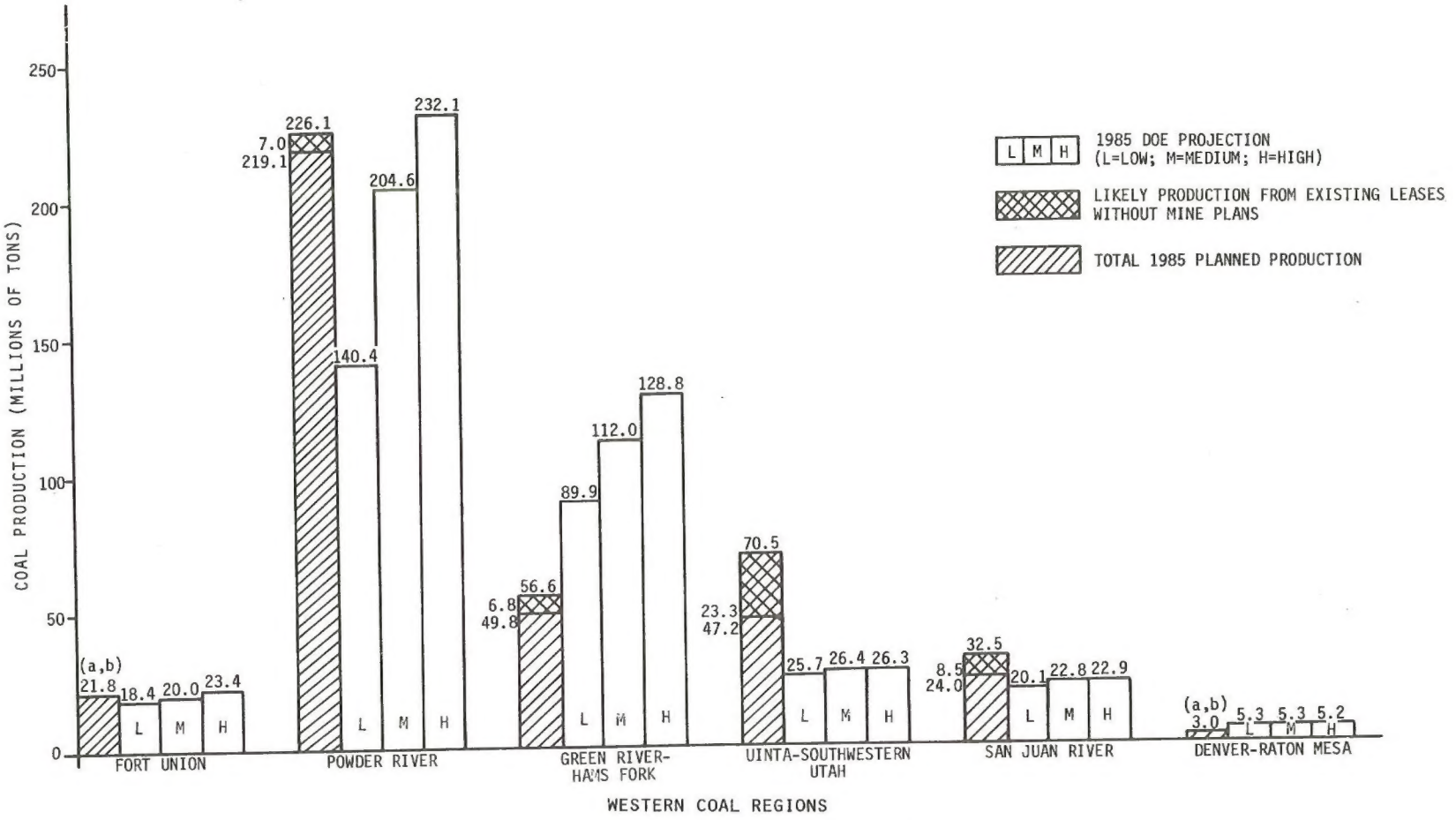
TABLE 2-31

SUMMARY OF PLANNED AND PROJECTED PRODUCTION, 1985
(million tons)

	TOTAL 1985 PLANNED PRODUCTION (a)	LIKELY PRODUCTION FROM EXISTING LEASES WITHOUT MINE PLANS (b)	TOTAL PLANNED AND LIKELY PRODUCTION	1985 DOE PROJECTIONS		
				LOW PROJECTION	MEDIUM PROJECTION	HIGH PROJECTION
Fort Union	21.8	(c)	21.8(d)	18.4	20.0	23.4
Powder River	219.1	7.0	226.1	140.4	204.6	232.1
Green River-Hams Fork	49.8	6.8	56.6	89.9	112.0	128.8
Unita-Southwestern Utah	47.2	23.3	70.5	25.7	26.4	26.3
San Juan River	24.0	8.5	32.5	20.1	22.8	22.9
Denver-Raton Mesa	3.0	(c)	3.0(d)	5.3	5.3	5.2
TOTALS	364.9	57.3(e)	422.2(e)	299.8	391.1	438.7

(a) Includes planned production for mine plans including Federal leases (Table 2-22). planned production from Indian Lands (Table 2-26) and planned production from wholly non-Federal mines (Table 2-30).
(b) See Table 2-23.
(c) Cannot be disclosed because of confidentiality requirements.
(d) Does not include likely production.
(e) Total includes likely production in Fort Union and Denver-Raton Mesa Coal Regions that is not disclosed on a regional basis.

Source: Reference Number 13.



(a) LIKELY PRODUCTION FROM EXISTING LEASES WITHOUT MINE PLANS CANNOT BE DISCLOSED BECAUSE OF CONFIDENTIALITY.

(b) DOES NOT INCLUDE LIKELY PRODUCTION.

SOURCE: TABLE 2-31

FIGURE 2-3

SUMMARY OF PLANNED AND PROJECTED PRODUCTION, 1985

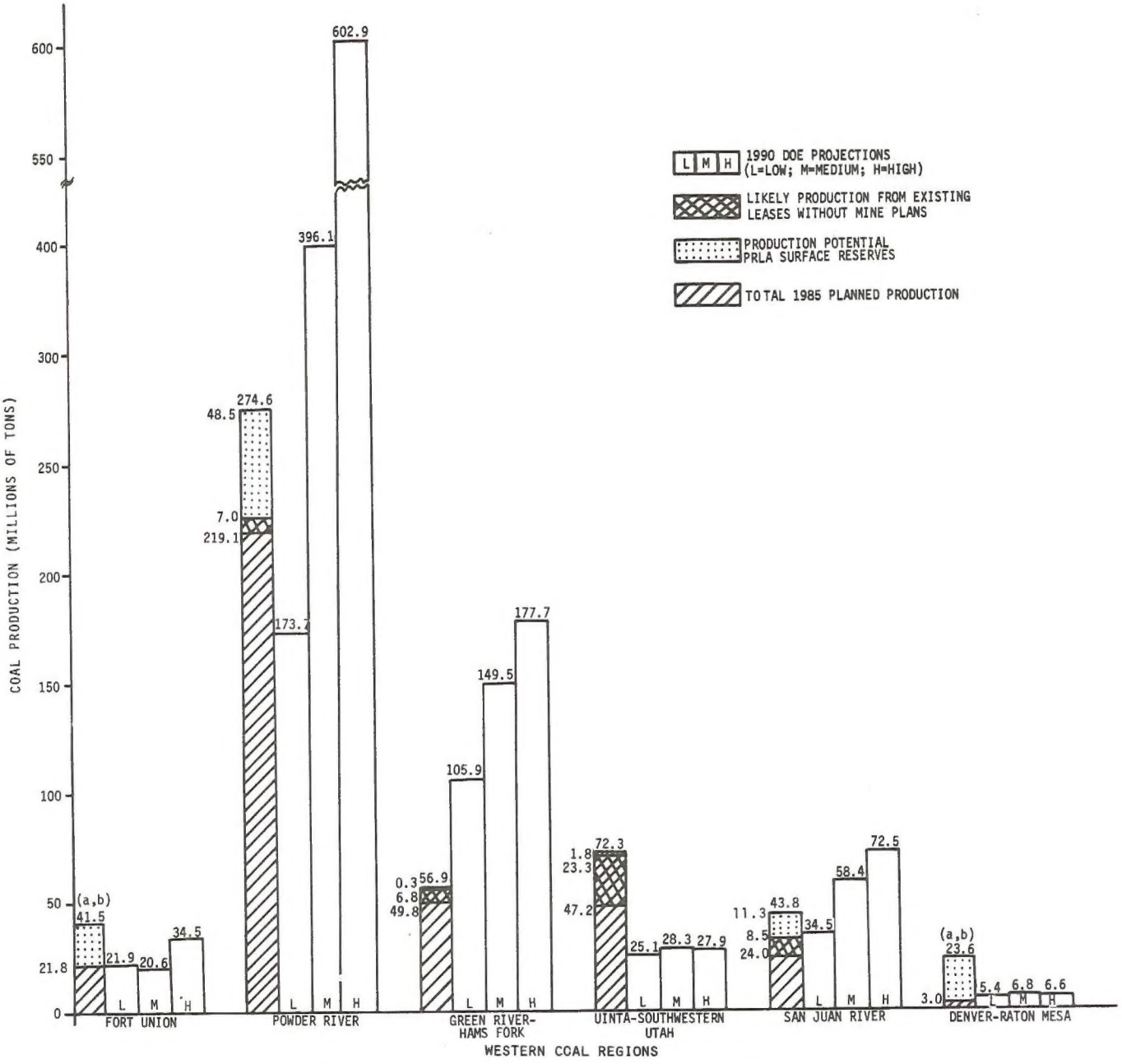
TABLE 2-32

SUMMARY OF PLANNED, POTENTIAL, AND PROJECTED PRODUCTION, 1990

(million tons)

COAL REGION	TOTAL 1985 PLANNED PRODUCTION(b)	LIKELY PRODUCTION FROM EXISTING LEASES WITHOUT MINE PLANS (b)	TOTAL PLANNED AND LIKELY PRODUCTION	PRODUCTION POTENTIAL PRLA SURFACE RESERVES(c)	TOTAL PRODUCTION POTENTIAL	1990 DOE PROJECTIONS		
						LOW	MEDIUM	HIGH
Fort Union	21.8	(d)	21.8(e)	(d)	41.5(g)	21.9	20.6	34.5
Powder River	219.1	7.0	226.1	48.5	274.6	173.7	396.1	602.9
Green River-Hams Fork	49.8	6.8	56.6	0.3	56.9	105.9	149.5	177.7
Uinta-Southwestern Utah	47.2	23.3	70.5	1.8	72.3	25.1	28.3	27.9
San Juan River	24.0	8.5	32.5	11.3	43.8	34.5	58.4	72.5
Denver-Raton Mesa	3.0	(d)	3.0(e)	(d)	23.6(g)	5.4	6.8	6.6
TOTALS	364.9	57.3(f)	422.2(f)	90.5	512.7	366.5	659.7	922.1

(a) Includes planned production for mine plans including Federal leases (Table 2-22), planned production from Indian lands (Table 2-26) and planned production from wholly non-Federal mines (Table 2-30).
(b) Figures obtained from Table 2-23.
(c) Figures obtained from Table 2-25.
(d) Cannot be disclosed because of confidentiality requirements.
(e) Does not include likely production.
(f) Total includes likely production in the Fort Union and Denver-Raton Mesa Coal Regions that is not disclosed on a regional basis.
(g) Total includes likely production & PRLA surface production potential.
Source: Reference Number 13.



(a) LIKELY PRODUCTION FROM EXISTING LEASES WITHOUT MINE PLANS AND PRODUCTION POTENTIAL PRLA SURFACE RESERVES CANNOT BE DISCLOSED BECAUSE OF CONFIDENTIALITY.

(b) TOTAL INCLUDES LIKELY PRODUCTION AND PRLA SURFACE PRODUCTION POTENTIAL.

SOURCE: TABLE 2-32

FIGURE 2-4

SUMMARY OF PLANNED, POTENTIAL, AND PROJECTED PRODUCTION, 1990

conclusion that there is no need for new leasing is achievement of 1985 medium or high production projections, followed by a sharp downturn in demand resulting in little if any further increases in production to 1990. If low projections are realized in 1985 as well as 1990, production increases would still be needed between 1985 and 1990 and the only way for Federal coal to make a major contribution to these increases would be through new leasing in the 1980 to 1983 time frame.

Unlike the low 1990 case, currently planned production is far less than the DOE medium 1990 projected production of 660 million tons. The addition of likely production from existing Federal leases without mine plans does little to alter this conclusion. The only regions which would be able to meet 1990 DOE medium projections from currently expected production are the Fort Union and Uinta-Southwestern Utah Coal Regions. These regions have only seven percent of 1990 medium production. The Powder River Coal Region has expected production totaling 226 million tons, far less than the DOE medium 1990 projected production of 396 million tons.

To achieve the DOE 1990 high production projections for all western regions of 922 million tons would require a level of production more than two and one-half times currently planned 1985 production. In the Powder River Coal Region, the 1990 high projection is 603 million tons, compared with 219 million tons in planned production. Planned production is less than the 1990 high projection in all regions except the Uinta-Southwestern Utah Coal Region.

There is not a great likelihood that western coal production would actually reach DOE's high projected levels in 1990. However, the high 1990 production projection represents a reasonable approximation of medium production projections for 1995. Although DOE did not prepare 1995 projections for the purposes of this statement, such projections have been made in the course of other studies. In making an assessment of the need to resume Federal leasing, as indicated above, the time horizon extends beyond 1990 to consideration of coal requirements expected as late as 1995.

It is unlikely that many PRLAs could be processed, leases issued, and production begun from these leases by 1985. The production potential of PRLAs is of importance mainly in considering 1990 production projections. In Table 2-30, production potential of PRLA surface minable reserves is shown. Because western mining is expected to be almost entirely surface mining except in the Uinta-Southwestern Utah Coal Region, underground PRLA reserves are likely to make an insignificant contribution to reaching 1990 production projections other than in this region. In the Uinta-Southwestern Utah Coal Region, there appears to be little problem in reaching any of the DOE projected production levels.

The addition of PRLA production potential provides a source of new Federal coal development between 1986 and 1990, when current Federal leases either would have already been developed or would have been cancelled. This potential production could play a key role if new Federal coal production is needed during this period to meet 1990 low production projections. Issuance of preference right leases would still leave total production potential from already indicated sources far below medium and high 1990 projected production. Only in the less critical Fort Union and Denver-Raton Mesa Coal Regions does the addition of PRLA production potential raise total production potential above the 1990 medium or high projected production.

An assessment of the need for new Federal leasing based on projections of demand and supply levels thus does not produce an unambiguous picture. For 1985, there appears to be little need for new leasing, except in one region, the Green River-Hams Fork Coal Region. For 1990, there could be some, but probably not a large, need for new leasing to reach low projected production levels. On the other hand, achievement of medium and high 1990 production levels would require extensive development of new sources of western coal production, especially in the Powder River, Green River-Hams Fork, and San Juan River Coal Regions. Because more than 70 percent of the coal in the six western Federal coal states is owned by the Federal Government, new Federal leasing would make a major contribution in achieving such development.

The absolute need for new leasing to meet national energy objectives thus depends on which assumptions about future energy demands and the role of western coal in supplying those demands prove to be most accurate. Uncertainty also exists about planned production estimates. How assured

is production currently planned or considered likely and how much production in fact is likely to occur but may not have been included in planned production estimates? Since it is impossible to know at this time which assumptions and estimates are actually correct, government policy must be flexible. An assessment must be made of the costs of leasing too much Federal coal if current need estimates prove too high, versus the costs of leasing too little Federal coal if higher estimates should turn out to be more valid.

In the past, the cost of leasing too much Federal coal has been to fail to obtain full value for the Federal coal, while also rewarding speculative behavior. Without effective enforcement of diligent development requirements, purchasers of Federal coal leases could hold on to these leases for long periods without developing them. Because expected development was still far off and still uncertain, sales of leases did not obtain prices commensurate with the leases' later development values. Moreover, the Federal Government lost control over the land use and environmental impacts of Federal coal development because the location and timing of such development became largely a matter for private initiative.

These problems would still exist in the future, although in somewhat moderated form, if the Federal Government were to lease too much coal in relation to need. Strict enforcement of diligent development requirements, mandated under the Federal Coal Leasing Amendments Act of 1976, would prevent any future speculative holding of leases for long periods. However, issuance of more leases than can be developed would still act to depress lease sale prices because of the resulting uncertainty about development prospects within the allowed diligent development period. Although more leases would be sold, the lowered prices per lease would probably more than compensate, resulting in reduced overall leasing revenues. The land use and environmental impacts of Federal leasing would depend on which of the excess number of issued leases are developed, making Federal control of these impacts less secure. Finally, a new problem would be introduced, in that strict enforcement of diligent development requirements might cause significant distortions and inefficiencies if many leases were threatened with cancellation. Coal companies might rush leases into production prematurely, offering high discounts and realigning coal shipments to find a place to ship the early production from the leases.

In considering the possibility of overleasing, it should be recognized that the amount of Federal coal offered is not necessarily the same as the amount actually leased. Fair market value requirements are likely to allow operators, especially the more efficient ones, a certain degree of leeway in their bid levels, but nevertheless would act to discourage marginal operators from acquiring tracts without sound market prospects. By insisting on full fair market value, the Federal Government could end up offering many more leases than are actually issued if there is not much demand. To some extent, the fair market value requirement thus minimizes the risk of the government leasing amounts of coal greatly in excess of market requirements.

In order to assess the impact of no further leasing of Federal coal, a special computer study was made in which future western coal development was limited to non-Federal coal and coal in already issued Federal leases. In addition, non-Federal coal dependent on unleased Federal coal for its development was considered unavailable for future mining. This study can be obtained on request [25].

According to the study, the greatest impact of no further Federal leasing would be experienced in the Powder River Coal Region in 1990. Under medium assumptions, production in this region in 1990 is projected to decline by 27 percent if there is no further Federal leasing. The Wyoming portion of the Green River-Hams Fork Coal Region showed a projected decline of 54 percent under a no leasing policy. Other western regions were either not greatly affected or showed production increases due to displacement of coal production from the Powder River and Green River-Hams Fork Coal Regions to these regions. Nationally, coal production in 1990 was projected to decline by 4 percent under a no leasing policy. For 1985, the study concluded that a no leasing policy would cause only minor impacts nationally and within the West.

National oil and gas consumption was projected to rise in 1990 by 300,000 barrels per day if there were no further Federal leasing (medium assumptions). According to the study, utilities would experience on average an eight percent national increase in delivered coal prices. This

would cause a 1.7 percent average national rise in electric utility rates. The estimated total resource cost to the Nation in 1990 of no further Federal leasing was projected to be $800 million per year.

The regions most adversely affected by a no leasing policy would be in the West, reflecting the fact that western coal supplies primarily western markets. According to study projections, the Rocky Mountain, West North Central, and Pacific regions would experience increases in delivered coal prices in 1990 of 29, 17, and 27 percent, respectively, if there were no further Federal leasing (medium assumptions). These coal price increases would cause overall electric power rates to rise by 6.4 percent in the Rocky Mountain region, 5.9 percent in the West North Central region and 1 percent in the Pacific region.

The principal consequences of leasing less Federal coal than is needed to meet national energy objectives would likely be to alter patterns of coal development, both at national and regional levels. At least on the basis of computer projections, it appears improbable that total national coal production would be greatly reduced.

2.8.2 Leasing to Promote More Desirable Patterns of Coal Development

The fact that currently planned and likely production, together with the production potential from PRLAs, is not sufficient to reach medium and high 1990 DOE production projections does not mean that these projected levels could not be attained without new Federal coal leasing. As shown in Tables 2-26 and 2-27, there are large amounts of Indian and other non-Federal coal reserves in western regions sufficient to meet almost any conceivable 1990 production requirements.

It is probably not desirable or feasible to emphasize development of this non-Federal coal. Large amounts of it have high production and environmental costs, due to uneconomically small parcel sizes (see Table 2-27), high stripping ratios, distances from transportation, and many other factors. Non-Federal underground coal reserves are not likely to make much of a contribution to western coal for some time, since most western coal is expected to be surface mined. Non-Federal coal is of varying quality, some of it having less desirable chemical composition or a low heat content. The large supplies of non-Federal lignite in the Fort Union Coal Region, for example, would not experience rapid development without a major expansion in coal use for gasification and liquifaction. Some non-Federal coal is located in less environmentally desirable locations such as alluvial valleys, which were the first areas to be acquired by early settlers. Indian tribes may oppose major coal development on their reservations or choose to develop their coal gradually over a lengthy period. Private surface owners above non-Federal coal may refuse consent under state surface owner consent laws or owners of non-Federal coal simply may not want to develop it at this time.

The difficulty of relying on non-Federal coal for expanded future production varies from region to region (see Tables 2-27 and 2-28). In the Powder River Coal Region, there is not much potential for production of non-Federal coal alone. In the Wyoming part of the Powder River Coal Region, the high quality, surface minable reserves are almost entirely Federally owned. In the Montana part, the better quality coal is divided among areas of solid Federal ownership, checkerboard ownership, and Indian ownership. It would be difficult to develop non-Federal coal in checkerboard areas without new Federal leasing. The Indian coal reserves would be sufficient for a large expansion of non-Federal coal production (see Table 2-24). However, the Cheyenne Tribe does not currently favor development of its coal reserves and there are many uncertainties about the future development of coal owned by the Crow Tribe.

The Green River-Hams Fork Coal Region contains a large checkerboard area in Wyoming in which expanded production beyond planned levels would be difficult without new Federal leasing. Because coal in the Uinta-Southwestern Utah Coal Region is largely owned by the Federal Government, this region is also relatively more dependent on Federal leasing for expanded production beyond already planned or committed levels. On the other hand, there are major holdings of non-Federal coal which could be developed without Federal leasing in the Fort Union Coal Region. The Denver-Raton Mesa Coal Region similarly has extensive non-Federal deposits. The San Juan River Coal Region appears somewhat less dependent on new Federal leasing because of the presence of Indian coal and some substantial blocks of developable non-Federal coal.

A decision by the Federal government not to lease Federal coal could have a number of impacts on future patterns of coal development. Production might simply be shifted from Federal to non-Federal coal within each region. The western regions more dependent on Federal leasing, especially the Powder River Coal Region, could experience declines in production which are displaced to other western regions less dependent on new Federal leasing, although a similar level of coal development might result in the West as a whole. It is also possible that western coal production would decline significantly, eastern production would rise correspondingly, and there would be little change in overall national coal production. Finally, there could be some declines in total national coal production, with the losses made up either by greater national energy conservation or by greater production from other energy sources.

It is impossible to predict with great confidence to what extent these possibilities would actually materialize. However, it appears that if there were no further leasing of Federal coal by 1990 there would probably be a significant decline in coal production below medium and high DOE projected levels from the Powder River Coal Region in Wyoming and Montana. This could be avoided only by large scale increases in production from Indian lands in that region. Less dramatic declines below projected levels would probably be experienced in the Green River-Hams Fork Coal Region. In other regions, production would be more likely to be displaced from Federal to non-Federal lands within the region, or there would be already adequate production potential for 1990 from mines — some including Federal leases — currently producing or expected to be producing.

If new production within a given region is forced to take place on the more limited non-Federal lands, it becomes likely, although it does not have to be the case, that some non-Federal sites would be devoted to coal production that are inferior to unleased Federal sites in their environmental and economic suitability for coal mining. Simply because the universe of sites to select from would be much smaller, one would automatically expect that it would be harder to find non-Federal sites with the lowest environmental and economic costs. Historically, purchasers of Federal lands and settlers under the Homestead Acts naturally gravitated toward the better and more productive lands, leaving the least wanted lands to remain in the public domain. Because of this, non-Federal lands are more likely to be used for farming or urban purposes and generally would have a higher current use value and thus a higher opportunity cost for coal mining.

If Federal coal is not available within a region, mines of inefficient sizes and configurations would likely have to be formed from non-Federal coal alone. For example, in areas of checkerboard ownership, pressures would be generated for development of the alternating non-Federal sections and of the five-section non-Federal blocks centered on state sections. If such development occurred, the normal pattern of mining would be distorted, mining costs would increase, and it generally would not represent the most efficient or environmentally satisfactory pattern of coal mining.

Without new Federal leasing, inefficient development patterns could also result from bypassing of unleased Federal tracts which lie in the path of ongoing mining operations (operating on existing Federal leases or non-Federal lands). Because it would usually be easy for an existing operation to mine a tract in its path, the bypassing of such coal foregoes the opportunity to produce relatively low cost coal. The coal bypassed would then generally be uneconomical to produce and would effectively be wasted.

If Federal coal is not available, some existing operations would very likely have to shut down because they could not obtain needed coal. In addition to being socially disruptive, this result might well cause coal development to move elsewhere in the region at higher cost and, by requiring new roads and other mining facilities and new housing and public services, increase the overall area in the region adversely affected by coal mining.

New Federal leasing would be expected to displace development of some existing leases and PRLAs. Existing leases were issued with a minimum of attention to land use planning and environmental considerations. The locations of PRLAs similarly reflect an absence of planning. Displacement of coal development from the sites of existing leases and PRLAs to sites of new Federal leases which would be selected on the basis of comprehensive land use and environmen-

tal planning almost certainly would result in an economically and environmentally improved pattern of development within a region.

A decision not to lease Federal coal would alter development patterns by significantly increasing the pressure to develop Indian lands, offering both potential benefits and costs of coal development to Indian tribes.

If Federal coal is unavailable, interregional shifts in coal development patterns, as well as intraregional shifts, would be expected to occur. The resulting altered pattern of coal development would have different environmental consequences and would represent a different interregional economic efficiency in coal production. For example, because of the unusual thickness of Powder River coal seams, on average more than five acres of land in the East and 3.5 acres in the Southwest would need to be mined and reclaimed in order to obtain the same amount of coal that could be obtained from one acre of land in the Powder River Coal Region. On the other hand, expanded production in the Denver part of the Denver - Raton Mesa Coal Region would minimize socioeconomic impacts, because this area, alone among the western coal regions, already has a large population with a highly capitalized public service base in place.

A decision not to lease could also result in somewhat less total coal production for the Nation. If national energy use is not correspondingly reduced, there would be greater demands on nuclear power, oil imports, and other energy sources. The foreign trade balance would be adversely affected by increasing oil imports and possibly by falling coal exports. The resulting overall national pattern of energy development might be less efficient and environmentally desirable than would the pattern which would result from new Federal leasing.

The discussion thus far has been qualitative. For some of the effects of Federal leasing on development patterns, there is little possibility of making precise quantitative estimates of their magnitude. It would be very difficult, for example, to predict how many bypass situations involving a need for Federal coal might arise or how many existing operations might have to shut down for lack of Federal coal. Shifts within regions to non-Federal coal if Federal coal would not be available are also very hard to predict. The precise manner in which such shifts would occur would depend on many site specific considerations and the particular requirements of proposed mines. This programmatic environmental impact statement does not attempt to predict exactly how intraregional shifts from Federal to non-Federal coal would occur without new Federal leasing or what the precise effects on coal production costs and environmental impacts within a region would be. An analysis of this nature would require a detailed examination of each region which is more appropriate to land use planning and an environmental impact statement at the regional level. Future Department regional lease sale environmental impact statements would closely examine intraregional impacts of Federal leasing actions.

In general, however, the clear expectation is that new Federal leasing would improve intraregional patterns of development. New leasing will be undertaken only after comprehensive land use and environmental planning is conducted. The much greater availability of lands for development, if Federal coal is available, offers much greater scope for finding the least costly and least environmentally damaging sites for coal development.

In keeping with its focus on interregional concerns, this programmatic environmental impact statement assesses the consequences of Federal coal management policy for the interregional pattern of coal development. In Chapter 5, estimates are shown of coal production in each region under different Federal coal management policies, including no new leasing. The environmental impacts of different interregional production patterns are analyzed. New Federal leasing may be needed if interregional patterns of coal development which result under a policy to resume leasing are judged to be preferable to those which would result if no leasing occurred.

2.8.3 Leasing for Legal and Administrative Purposes

As previously noted, new competitive leasing, whether conducted or not, would be only one component of a Federal coal management program. The Department has little choice legally but to process PRLAs and, for those applicants able to show commercial quantities of coal under appropriate environmental controls, either to issue a noncompetitive lease or to offer an exchange, purchase, or other suitable compensation. A

resumption of Federal leasing, at least to the extent of issuing noncompetitive leases for appropriate PRLAs thus appears necessary. A formal leasing program would be required at a minimum to process the PRLAs, conduct land use planning that is statutorily mandated before leases can be issued, assess environmental impacts of PRLA leasing, and consider whether exchange (where permitted by statute, see discussion in Section 3.2.10 and Appendix I), purchase, displacement through new competitive leasing or other approaches are most appropriate for dealing with environmentally unsatisfactory PRLAs.

As part of its preferred coal management program, the Department would take steps such as exchange or purchase to prevent development of existing leases as well as PRLAs in environmentally unsuitable areas. As has been mentioned, many existing leases and prospecting permits were granted without much attention to their environmental impacts. The pressures for development of both existing leases and PRLAs would be heightened if new Federal leasing does not take place. The likely administrative and financial burdens on the Department to acquire leases in unsuitable areas could therefore be reduced by new leasing.

Federal and state governments would benefit from the added bonuses and royalties which could be obtained from sales of new Federal leases. The Federal Government is under no obligation to preserve private rents and profits by refraining from making alternative Federal coal supplies available to the market.

2.8.4. Leasing to Increase Competition in the Coal Industry

There are certain conditions which must exist in order for private markets to function in the most socially beneficial manner, making the best coal available at the lowest prices. A particularly critical requirement is that there should be a sufficient number of buyers and sellers that the markets are genuinely competitive and that no one or few buyers can influence prices in a monopsonistic or oligopsonistic fashion.

The national importance of the coal industry has generated considerable concern about its competitiveness. Studies of competition in the coal industry have been issued in the past two years by the Antitrust Division of the Department of Justice, the Federal Trade Commission, and the General Accounting Office [15, 26, 27].

A decision not to lease Federal coal would tend to inhibit competition in the western coal industry. Coal purchasers would have to obtain coal from those companies holding existing Federal leases or possessing non-Federal sources. In regions such as the Powder River Coal Region, where the great majority of mining sites are dependent on the availability of Federal coal, new entry into coal mining could be achieved only by purchases of already existing leases from their current holders. Because of such considerations, the Antitrust Division of the Justice Department, in a 1978 report, Competition in the Coal Industry [15], recommended resumption of Federal leasing to promote greater competition in the western coal industry. The report concluded that: "Resumption of the Federal leasing program with all deliberate speed will have beneficial competitive effects."

2.9 OVERVIEW OF THE NEED FOR A FEDERAL COAL MANAGEMENT PROGRAM

The Federal Coal Leasing Amendments Act of 1976, and other recent legislation for the public lands, lay a legal and policy foundation for the Department of the Interior's management of coal owned by the United States Government. The act expresses the intent of the Congress that, through a process of competitive lease sales, Federally owned coal be sold for a fair price from the public domain to coal operators at a rate meeting market needs for new supplies.

The President, in his Environmental Message of 1977 [12], directed the Secretary of the Interior to take certain steps to improve the management of Federal coal reserves, and to operate a coal leasing program capable of responding to reasonable production goals. The President's National Energy Plan, which sets forth the national interest in the substitution of coal for oil and gas as an energy source, and the Power Plant and Industrial Fuel Use Act of 1978 reflect the judgement of the President and the Congress that the Federal Government should encourage and foster the use of coal [22]. The increased demand resulting from the 1978 act would be felt most strongly in the years between 1985 and 1990. The Department, in considering the need for leasing, must plan for the often considerable delay between the time when a

mining company acquires a coal reserve and the time when production begins. Designing a mine plan, assembling equipment and constructing the mine, and studying and designing modifications required to comply with state and Federal laws takes from four to seven years. In some cases, production from new leases may not begin for up to 10 years, which is the maximum delay between leasing and production allowed under the Federal Coal Leasing Amendments Act of 1976.

Because of these time requirements, a leasing program which results in some lease sales in 1980 could not be relied on to have a significant impact on production until after 1985. Existing leases provide an alternative to new leases as a source of coal to meet demand for 1985, because on these leases mining companies can begin now the technical and economic work required to develop production capacity. The consequences of this planning are reflected in production plans reported by those companies (see Table 2-22). Industry plans for development of existing leases and of non-Federal reserves help account for the generally low level of new leasing assessed by the Department's studies as needed to meet 1985 production targets.

To aid in considering alternative programs to implement the President's directive that Federal coal leasing be a tool to help achieve coal production objectives, the Secretary has directed that the Department's Federal coal policy review include an analysis of the demand for Federal coal, and a review of the probable production from existing leases. As was explained, analysis of potential production and analysis of probable demand can not be done with precision because of uncertainties and variables within both the broader economy and the coal industry.

Almost all demand forecasts, however, point to significant increases in the use of coal, with both demand and production increasing at a faster rate in the western United States than in other areas. Such forecasts are reinforced by recent experience. The rate of growth in production of coal in the western states (see Table 2-7) has increased suddenly and substantially over production growth rates in the midwestern and eastern coal fields during the past few years. The rate of growth for production of coal from Federal leases, due in part to diligence requirements, is even higher than the overall western increase, making Federal reserves the most rapidly growing source of coal in the Nation.

After 1986, however, the Nation would not be able to count on significant additional production from existing Federal leases. The Department's diligent development regulations under the Federal Coal Leasing Amendments Act of 1976 require that pre-act existing leases not in production by 1986 be cancelled, with a few possible exceptions. This means that the presently existing leases not in production by 1986 will revert to Federal ownership, and again become part of the general body of unleased Federally- owned coal reserves.

Because actions taken by the Department now will affect the potential for production of Federal coal in 1990 and beyond, the Department must consider present actions in terms of these uncertain future demands. It is clear that, to whatever degree existing Federal coal leases must be considered as an alternative to new leasing in meeting coal production needs, this alternative, already made uncertain by the environmental and economic weaknesses of earlier leasing, virtually disappears when the Department meets its responsibilities to both enforce diligent development and to recognize that today's resource management decisions would determine how much coal is available for production in 1986 and years after.

Currently planned coal production appears likely to be sufficient to meet most 1985 projected needs in the West. However, there is not much additional capacity to meet the considerably larger 1990 expected coal requirements. Unless the DOE low projections for 1990 turn out to be the correct ones, and the DOE medium or high projections for 1985 are met in 1985, a substantial expansion in western coal production would occur between 1985 and 1990.

Because of the dominant Federal share in western coal ownership, it is natural to expect that Federal coal would play a major role in expanding western coal production between 1985 and 1990. As noted, the enforcement of diligent development requirements would mean that, aside from expansions in already operating mines, increases in production of Federal coal after 1986 will have to come from new Federal leases. Because of the substantial time lag between the decision to hold a lease sale and actual coal production, Federal leases expected to come into production from 1986 to 1990 should be issued soon.

It is true that a resumption of significant Federal leasing in the near future runs the risk that, if low 1990 production projections are borne out, there would be more coal under lease than could be developed. However, the Nation's energy and coal leasing policies cannot be predicated on the assumption that future western coal production would be lower than is currently considered likely. The time lags between the decision to lease and the occurence of actual production are such that an assumption of this nature could well be self-fulfilling.

Besides helping to meet national energy objectives, new Federal leasing is needed to ensure that future western coal development is carried out as efficiently and with as little damage to the physical and human environment as possible. Because of the large Federal ownership of western coal, a major expansion of western production without the availability of Federal coal, even if it were possible, would result in a distorted pattern of coal development, almost certainly a less efficient and environmentally satisfactory one. In many cases, the key consideration in mine site selection would become the ability to avoid the need for Federal coal, rather than the basic economic and environmental desirability of the site.

In many areas, patterns of land and mineral ownership caused by early settlement policies have created a complex division of ownership and jurisdiction, with tracts of Federal coal interspersed with private, state, and Indian coal. Because individual tracts are often not large enough to justify investments, development opportunities for non-Federal coal in many of these areas would be limited unless adjacent Federal coal could also be mined. These ownership patterns add to the uncertainties about production potentials, because theoretical production of much non-Federal coal may not in fact be achievable without development of Federal coal and, conversely, a decision favoring the leasing and development of specific amounts of Federal coal may in fact lead to production of greater non-Federal reserves.

In addition to the planning and resource management requirements of the Federal Coal Leasing Amendments Act of 1976, future management decisions about Federal coal would be governed by the Federal Land Policy and Management Act of 1976 and the Surface Mining Control and Reclamation Act of 1977. These acts, in combination, create a management and regulatory framework which provides detailed requirements for determining where, and under what circumstances, Federal coal may be leased and mined. Taken as a whole, these laws and related regulations require that the Department of the Interior's decisions about the management of Federal coal reserves conform to, and be integrated with, a broader public land planning and resource management process. The overall planning process considers all Federally-managed resources, and the interests of institutions and people who use the resources or are affected by resource use decisions.

Consideration of these other resources and interests has the effect of placing prohibitions or limitations, some mandatory and some discretionary, on the production of Federal coal. These limitations, designed to protect human communities, agricultural resources, private property rights, wildlife, natural habitats, recreation areas, and diverse other resources and resource uses, are reasonable and flexible enough to assure that Federal coal can, in fact, be produced while the other interests are protected. Most of the protective standards and procedures were put in place within the last two years or less, long after almost all existing Federal coal leases were issued.

This means that all future leasing must not only conform to, but be a product of, a planning and regulatory process designed to be protective of the environment and of other resources and interests. Coal production decisions resulting from this process would be made in compliance with agreed-on land use planning and environmental protection requirements. However, there is no such assurance that past Federal leasing decisions made prior to the adoption of these new standards would, if the leases were produced, meet the planning and environmental requirements.

Hence, the Department, in trying to assess the potential of existing leases to serve as an alternative to unleased Federal coal in meeting future demand, must assign more uncertainty to production potential from existing leases than would be assigned to new leases. It is clear that, from an environmental standpoint, existing leases cannot be presumed to be a preferable alternative to prospective new leases. Neither, of course, can the Department assume that existing leases would fail to meet present environmental standards. To

measure the possible contribution of coal from existing leases toward future energy needs, the Department must receive and review specific lease development proposals, determine if the proposed mines could be operated in conformance with present standards, and forecast the production from existing leases to compare that, and other expected production, with predicted demand for coal. A similar but, in many cases, less comprehensive analysis by state and Federal agencies would precede decisions allowing production of coal from non-Federal reserves. As in the case of already-leased Federal reserves, the Department cannot assume that the production of non-Federal coal would cause less (or more) environmental damage than would be caused by development of new Federal leases.

The decision before the Secretary at this time is whether to adopt the preferred Federal coal management program, or an alternative, as described in this programmatic environmental impact statement, which would be capable of considering specific leasing options, as a part of the Department's responsibility for management of Federal coal resources, within a process which assures that both the need for and environmental impacts of such leasing options are adequately considered prior to a decision to hold lease sales.

Should the Secretary adopt such a program, the need for leasing would be continually assessed through an open, publicly accountable process which compares likely production to likely demand, determines where and when production may fall short of demand, and decides how much Federal coal should, within the limitations of resource management and environmental standards, be leased to assure production sufficient to meet demand. Evaluation of demand would include the use of the best available techniques for analysis of energy use. Evaluation of anticipated production would include all information available to the Department about the production plans for Federal and non-Federal coal reserves.

Such a process would assure that individual proposals for specific coal leasing would be reviewed to determine their consistency with the coal production objectives of the coal management program. While such an assessment at this time shows that some new leasing should be considered now, and that the need for leasing would increase significantly in a few years if coal production forecasts for 1990 are to be achieved, the need to operate a Federal coal management program does not rest on the current assessment of future coal supply and demand. Forecasts of energy consumption and of available energy sources are based on assumptions which are subject to change. Discovery of additional or alternative energy sources, advances in technology, successes in energy conservation programs, variations in the rate of growth of electric power use, and many other factors could cause coal demand forecasts to be significantly revised, up or down. Sound long run government policy must acknowledge this uncertainty, and not assume that today's forecasts must inflexibly govern resource production decisions of the future.

The Federal coal management program described in Chapter 3 is capable of such flexibility. The process of analysis and review, which incorporates sound land use planning and environmental protection with the identification of those coal reserves most suitable for development, provides both industry and the Department sufficient opportunity to plan for increases in coal demand. Should demand be significantly lower than was projected, diligent development regulations would assure that leases not put into production are returned to Federal ownership. Moreover, regular biennial reassessments of leasing needs as proposed in the preferred program and several other alternatives would allow frequent adjustments in the amount of Federal coal under lease in response to these needs. Any under-leasing or over leasing which results from erroneous facts or assumptions would be compensated by more or less leasing in the next reassessment cycle. And, as the amount of Federal coal under lease increases or decreases in response to local, regional, and national demand for coal, the preferred program would assure that both site-specific and cumulative environmental impacts of Federal coal production are adequately considered.

As important as the consideration of any particular leasing options is the need for the Department to put a coal management program into operation, so decisions about the management of Federal coal can be incorporated into the land use planning systems of the Bureau of Land Management and Forest Service. Just as decisions about Federal coal can not be wisely made in isolation from decisions about wildlife manage-

ment, grasslands, water, community development, and the many other resource management issues which must be considered by the Department, so those other decisions cannot be responsibly made in isolation from consideration of how Federal coal would be managed. As previously noted, these management decisions concern many other actions besides competitive coal leasing. They include decisions on administration of existing leases; the issuance of PRLAs; and the readjustment, relinquishment, cancellation, termination, assignment, and any other transfer of leases.

The preferred coal management program described in this programmatic environmental impact statement, while largely the product of intensive development during the past 18 months, has been in the preparation and review stage for five years. The operation of a complex program designed to integrate Federal coal management decisions with other Federal, state, and local resource decisions is not a simple matter. If the Nation is to be assured of meeting its future energy objectives in the most efficient and environmentally satisfactory way possible, a program for the management of the Federal coal resource is essential.

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CHAPTER 3

THE PREFERRED COAL MANAGEMENT PROGRAM AND ALTERNATIVES

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CHAPTER 3

THE PREFERRED FEDERAL COAL MANAGEMENT PROGRAM AND ALTERNATIVES

The National Environmental Policy Act of 1969 requires the preparation of an environmental impact statement on "any major Federal action significantly affecting the quality of the human environment". A principal task of the one and a half year old interagency Federal coal policy review has been the selection of the proposed action for this programmatic environmental impact statement. A series of issue option papers was prepared on the alternatives and subalternatives which would affect the substance and procedures of a Federal coal management program. Preferences for specific policy options among those presented in the issue option papers were expressed by the Secretary of the Interior or the Under Secretary between October 1977 and March 1979. The procedures followed in the coal policy review to determine the policy option preferences are described in Section 3.2.1 and the various options presented to the Secretary and Under Secretary, the pros and cons associated with each option, and the preferences expressed by the Secretary or Under Secretary are summarized in Table 3-2 accompanying Section 3.2.1. These numerous policy option preferences have been integrated into a complete proposed Federal coal management program which is the proposed major Federal action in this statement. This proposed program, composed of the preferred policy options, is termed the preferred program and is presented in Section 3.1.1 and discussed in greater detail in Section 3.2.

The principal policy options not preferred by the Secretary form the six major alternatives to the preferred program:

- No new Federal leasing until at least 1985.
- Process and lease only outstanding preference right lease applications.
- Lease only bypass coal and coal needed to maintain existing operations (emergency leasing).
- Lease to meet the coal industry's indications of need.
- Allow state determination of leasing levels.
- Lease to meet Department of Energy coal production goals. Other policy options not preferred by the Secretary form the major subalternatives analyzed in Chapter 5, Section 5.4.

Each alternative focuses on a different administrative and policy limitation on the determination of the level of Federal coal leasing to be achieved. They were selected to bracket the range of leasing activity that could result from a Federal coal management program. Because of the stringent statutory and policy restrictions under which the Federal coal policy review is being conducted, any alternative to the preferred program which might be adopted would be similar in most of its details to the structure described for the preferred program. Some of the alternatives would remove certain components of the preferred program (i.e., eliminate new competitive leasing fully for the first two alternatives and effectively for the third alternative), while others would merely shift the responsibility, in whole or in part, for the final decision on how much and which coal will be offered for lease sale (from the Department to the industry in the fourth alternative, to the states in the fifth alternative, and to the Department of Energy in the sixth alternative). Various alternatives also differ from the preferred program in the sequence of, and extent of data required for, decisions in a coal management program. Each of the alternatives is described in Sections 3.1.2 through 3.1.7. Other alternatives not analyzed in this statement and the reasons for excluding them are briefly discussed in Section 3.1.8. The descriptions of the six major alternatives are not as detailed as the description of the preferred program since, as previously noted, most of the components of the preferred program would be incorporated in the various alternatives. The more

detailed description of the preferred program in Section 3.2 contains an explanation of which components of the preferred program are compatible or incompatible with the other major alternatives.

In order to accommodate the reader with a complete visualization of the Federal coal management program, and provide insights on Departmental policy and planning, this document provides in Appendix A, the proposed regulations for that program. If the Secretary upon review of this statement, decides that a program is needed, and actually selects a Federal coal management program that reflects his earlier policy preferences (i.e., preference for the preferred program), then the later regulations that were officially proposed on March 19, 1979 (44 Federal Register 16800-16845) would govern the operation of that program. Both the detailed discussion of the preferred program in Section 3.2 and the proposed regulations in Appendix A should permit the reader to make more specific the comments he or she may wish to offer on this statement and the proposed action. All comments received by the Department on this statement will be considered in the selection by the Secretary of the coal management program the Department will establish and the development of the program's final regulations.

Adoption of any one of these alternatives as the new Federal coal management program would likely result in coal leasing, coal production, and coal-related development activity levels for each coal region different from those which would occur under the preferred program. Taken together, the preferred program and the six major alternatives are intended to cover a full range of coal leasing, coal production, and coal-related development possibilities. The estimated levels of leasing, production, and development which would result from these alternatives are presented in Chapter 5 of this statement and are the basis of that chapter's assessment of the environmental impacts from coal development under each alternative. Chapter 5, Section 5.4 also discusses the impacts of the series of subalternatives which, if adopted, could be incorporated into one or more of the major alternatives.

3.1. DESCRIPTION OF THE ALTERNATIVES

In this section, the preferred program and other alternatives are described.

3.1.1. The Preferred Program

At the outset of the Federal coal policy review, the Secretary established four primary goals the Department must meet for management of the Federal coal resource. These primary goals are:

- Employ land-use planning and effective enforcement of environmental laws to assure that Federal coal is committed to production and produced in an environmentally acceptable manner which is responsive to local communities and land owners affected by Federal coal development.
- Assure that sufficient quantities of Federal coal are produced to help meet the objectives of the National Energy Plan.
- Assure that Federal coal is produced in an economically efficient manner, with a fair economic return to the United States for all coal produced.
- Emphasize consultation and cooperation with state governments in planning the leasing and development of Federal coal.

The preferred Federal coal management program would incorporate these goals; the expressions of preference for certain policy options by the Secretary and Under Secretary; the requirements of the appropriate statutes, principally the Mineral Leasing Act of 1920, the Federal Coal Leasing Amendments Act of 1976, the National Environmental Policy Act of 1969, the Federal Land Policy and Management Act of 1976, and the Surface Mining Control and Reclamation Act of 1977; and the direction provided by the President in his 1977 Energy and Environmental Messages to the Congress.

The preferred program includes eight major elements:

- A planning system, involving close consultation with state and local governments, industry, and the public (1) to decide which areas of Federal coal reserves would be considered acceptable locations for coal production, and (2) to delineate, rank, and select for sale specific tracts of coal.

- A system for evaluating the national demand for coal and for determining production which should be stimulated by the leasing of Federal coal.
- Procedures for conducting sales and issuing leases.
- Post-lease enforcement of terms and conditions.
- Procedures for management of existing leases issued prior to implementation of the new program.
- Procedures for processing existing preference right lease applications.
- A strategy to integrate the environmental analysis requirements of the National Environmental Policy Act of 1969 in the new program.
- Procedures to start-up the new program and to offer lease sales in emergency situations.

Set forth below is a general overview of the eight major elements of the preferred alternative for a Federal coal management program. Figure 3-1 displays a simple flow chart for the preferred alternative.

The draft version of this statement published on December 15, 1978, contained in its Appendix A a set of example regulations for the preferred program. The example regulations were meant to indicate to the reader what type of regulations the Department might propose if the Secretary, after reviewing this final statement, were to select the preferred program. Example regulations were provided in order to respond to one of the principal public and judicial criticisms of the 1975 final environmental impact statement for the last proposed Federal coal management program (see Sections 1.2.4 and 1.2.6), namely, that the preferred program was not adequately described.

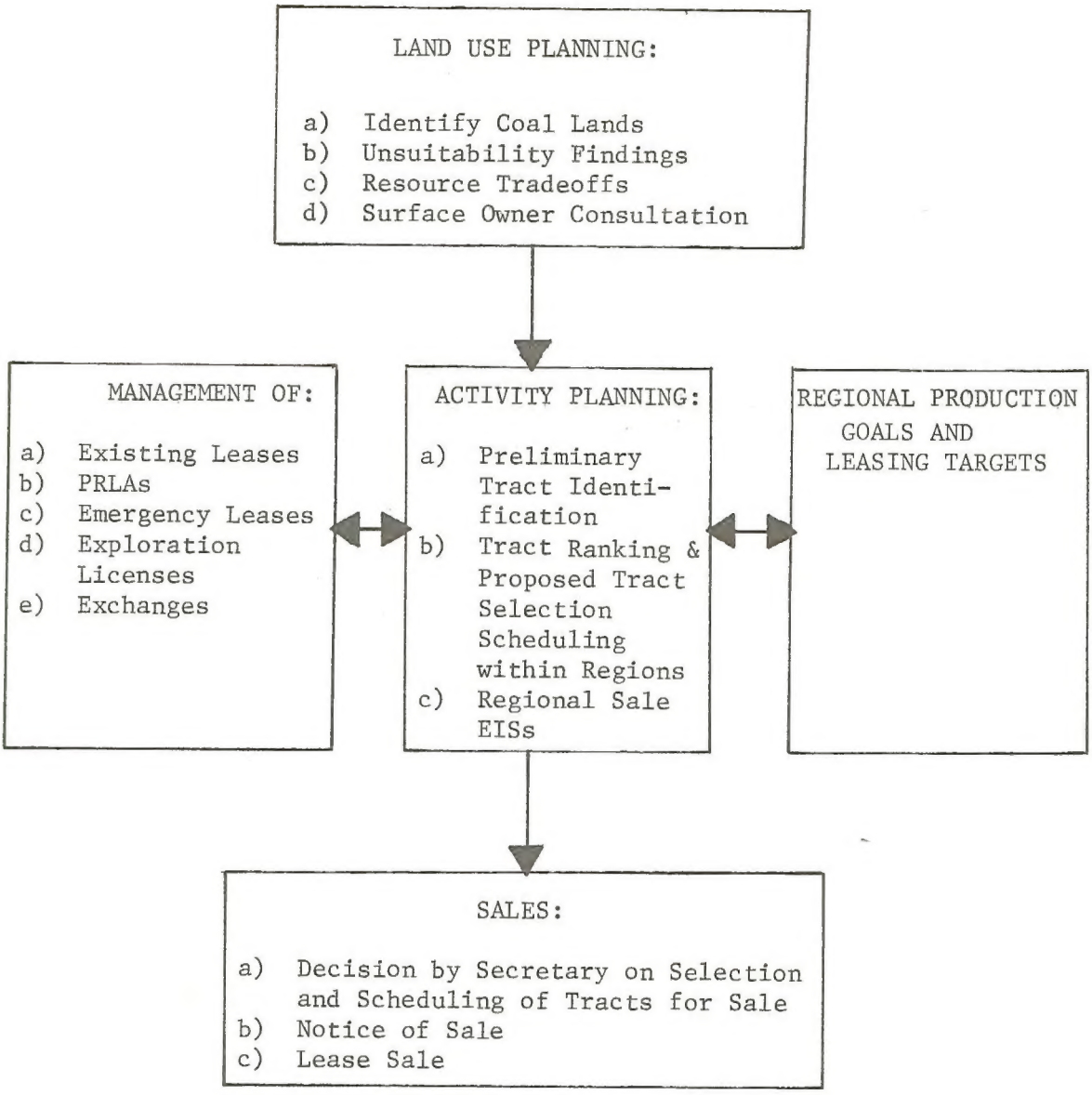
Simultaneous with the publication of the draft version of this statement, the Department gave notice of intent to propose rules (43 Federal Register 58776). The example regulations were modified after review of the testimony and written comments received on the draft statement and were published as proposed rules on March 19, 1979 (44 Federal Register 16800-16845). By scheduling the proposed rulemaking between the publication dates for the draft and final environmental impact statements, the Department sought to provide the public with sufficient time to comment on the proposed rules without the burden of being asked to address simultaneously the varied issues discussed in either the draft or final statement. The lengthy overview of the preferred program in this section, the more detailed discussion of certain aspects of the program in Section 3.2, and the proposed rules set forth in Appendix A should provide the reader with a complete picture of how the preferred program would operate.

For a similarly detailed understanding of all the Department's coal-related activities, the reader may wish to review the regulations of the United States Geological Survey under 30 CFR Part 211, as revised by rulemaking published in 43 Federal Register 37181–37196 on August 22, 1978; the final regulations of the Office of Surface Mining Reclamation and Enforcement under 30 CFR Chapter VII published in 44 Federal Register 14902-15463 on March 13, 1979, and proposed planning regulations for the Bureau of Land Management under 43 CFR Part 1600 published in 43 Federal Register 58764–58774 on December 15, 1978. Finally, the reader may also wish to consult the Forest Service's proposed planning regulations under 36 CFR 219 published in 43 Federal Register 39046–39059 on August 31, 1978.

3.1.1.1 Planning Systems. In the preferred program, the Department would rely on the land management agencies' land use planning processes and the Bureau of Land Management's activity planning process to provide the initial forums for the making of the principal decisions in the Federal coal management program. Activity planning would then take place through an entirely new structure.

Land Use Planning. The critical decision during the land use planning process of the land management agencies (prinicipally the Bureau of Land Management and the Forest Service) would be, under the preferred program, the identification of areas acceptable for further consideration for coal leasing. The areas acceptable would be identified by screening out areas that:

- Are considered not to contain coal reserves of high to moderate development potential.
- Are considered unsuitable for leasing under the provisions of Section 522 of the Surface Mining Control and Reclamation Act (SMCRA) and the President's Environmen-



(See Figures 3-2, 3-4 and 3-5 for more detailed presentations of the preferred program.)

FIGURE 3-1

SUMMARY OF THE PREFERRED PROGRAM

tal Message through the application of lands unsuitability criteria.

- Are considered to be of higher value for other uses as determined by multiple-use, resource management trade-off decisions.
- Include split estate lands where the coal would be recovered by surface mining methods and a significant number of surface owners (as defined in SMCRA) have indicated a preference against surface mining of their land, except in the rare case in activity planning where the Bureau of Land Management determines that no other areas acceptable for further consideration for coal leasing could produce sufficient tracts for lease sale to meet the regional leasing target. The Department is also considering a procedure which would permit an individual surface owner to remove his particular land from further consideration for leasing by means of expressing a firm intent not to provide consent to mine during the lifetime of the land use plan (up to 15 years).

The land use plan could also limit development levels or rates within the areas identified as acceptable for further consideration for coal leasing. This use of development levels or rates is called the threshold concept; it would be an integral part of the land use planning process. As examples of the manner in which this concept could be employed, in acceptable areas a maximum threshold for mining employment might be established in response to state government requests for planning to affect community growth rates, or a minimum threshold on the area of habitat for a particular wildlife specie might be established for resource conservation reasons. Then, the Federal land manager or the responsible official would not lease coal if the additional development could be expected to push total mine employment in the area over, or the total area of the particular species' habitat under, the specified threshold levels. Thresholds would be used to control impacts which depend on an overall development level rather than on site-specific effects.

All potential resource users would be invited and expected to participate actively in the land use planning process. Each potential user — whether a coal company, a livestock operator, or an environmental organization — should voice its opinion concerning the uses to which the land should be put and should provide sufficient information to support that opinion. The land use planning process provides numerous opportunities for such participation. The expertise of, and information available to, the potential users is needed by the land management agency to ensure that an adequate land use plan is prepared. For example, coal company data may show coal which can be regarded as high or medium potential of which the land use planner is not aware; an environmental organization may know of a situation, not disclosed in the planning data, which requires the application of an unsuitability criterion; or the coal company may be able to demonstrate conditions or potential mining techniques, not known to the planner, which qualify for an exception to the application of an unsuitability criterion.

Activity Planning. Activity planning for each Federal resource — coal, timber, forage, etc. — in the planning area follows completion of the land use plan. Under the preferred program, coal resource activity planning would be conducted by the Bureau of Land Management and would involve the delineation, ranking, selection, and scheduling of tracts for lease sale from the land identified in the land use plan as areas acceptable for further consideration for leasing.

The first step in activity planning would be to delineate preliminary tracts from within the acceptable areas. Delineation efforts could take place beginning about 30 to 60 days after a land use plan is filed. The boundaries of the preliminary tracts would be drawn primarily on considerations of technical coal data, resource conservation considerations, and surface ownership patterns. Readjustments of boundaries to reflect environmental or social considerations would occur as the tract ranking and selection process proceeds.

Before tracts are delineated, the Bureau of Land Management would publish a call for submissions by industry of expressions of interest in leasing possible tracts. In addition to the request for industry expressions of leasing interest, the states would be encouraged to suggest possible tracts, particularly tracts of importance to the leasing of state-owned coal. These submittals would be the critical element in the decisions on delineation and subsequent ranking of tracts, since

the interest of companies or the states in those areas would normally reflect important data collected by both parties and market judgements by the companies.

Once the land management agency has identified preliminary tracts, it would begin analyzing the potential environmental impacts and geology related to each tract. The agency would work closely with other Federal agencies, state and local governments, and other interested parties during this process.

All three of the above steps – submission of expressions of leasing interest, tract delineation, and site-specific analysis – are designed to follow the completion of individual land use plans and to be conducted in the land use plan areas. The following steps are designed to precede the setting of a four-year lease sale schedule and to be conducted in multistate regions.

As the next section discloses, the Department has divided the country into coal regions to develop regional leasing targets. In cooperation with all involved land management agencies and the affected state and local governments, the Department would rank all delineated Federal coal tracts within a production region. Generally, ranking would take place every four years. Selected from these ranked tracts would be those tracts to be included in a proposed four-year lease sale schedule. The number of tracts selected and the proposed timing of their sale would be determined by considering the leasing target for the region established by the Department. Should the regional leasing target appear to exceed greatly the producible coal in the more highly ranked Federal tracts, the target itself could be reevaluated and modified. The tract delineation, ranking, and selection decision would be discussed in an environmental impact statement which would consider the site specific impacts and cumulative regional impacts which would ultimately result from the sale of leases for all the selected tracts in the region over the four-year period.

The participation of state and local governments would be sought actively during the tract ranking and selection process, particularly to ensure consideration of social and economic impacts and problems associated with potential coal development. State participation would be ensured by the establishment of regional coal teams composed of BLM personnel and state governors' representatives to oversee the tract ranking process, to conduct the tract selection and scheduling procedures, and to make the lease sale recommendations to the Secretary. The public would also participate in this process. Regardless of any additional public participation procedures which may be employed, public hearings would be held on the environmental impact statement prepared on the regional tract delineation, ranking, selection, and scheduling process.

From among the tracts selected for lease sale, the Secretary would designate, where appropriate, specific tracts to be offered for sale only to small businesses and to public bodies (Federal and state agencies, municipalities, and rural electric cooperatives and similar organizations, and nonprofit corporations controlled by any of those entities). The decision on these two types of set-aside sales would be made after the Secretary reviews the information provided by public bodies through submissions of expressions of interest in the activity planning process and consults with the Small Business Administration.

Stipulations would be attached to the proposed leases for the tracts selected for lease sale to mitigate adverse environmental and social impacts. These stipulations would incorporate measures which the Department considers necessary as a result of the general environmental analyses conducted in the land use planning and site-specific activity planning processes. It is expected that many of these stipulations would be based on the application of the unsuitability criteria and their exceptions. The leases would also require compliance with the Surface Mining Control and Reclamation Act of 1977.

No tract of Federal coal which includes a surface estate owned by a private surface owner as defined in SMCRA and which, if leased, would be mined by surface mining methods would be offered for lease sale unless that owner has given his or her consent to mine. It would also be removed from any activity planning procedures until the governing land use plan is revised if the surface owner files with the local BLM office a written notice of refusal to give consent.

Before making a final decision on which, if any, tracts to offer for lease sale, the Secretary would formally consult with the governors of states in which tracts are being proposed for sale. Should a governor object to the offering of any proposed

tract within his state, he would be given a period of time in which to prepare and present his arguments to the Secretary.

3.1.1.2 Production Goals and Leasing Targets. The major coal bearing areas of the country have been divided into 12 coal regions. Eight of these regions contain significant reserves of Federal coal and the six westernmost of these regions are expected to play the principal role in any Federal coal leasing scenario. In the preferred Federal coal management program, each region would be managed largely as a separate coal production unit with many of the management responsibilities delegated to regional Department/state teams. Within each of these eight regions, a total regional production goal and, based on an assessment of new leasing needs, a regional leasing target for new logical mining units containing Federal coal leases would be formulated.

Regional production goals and leasing targets would be derived every two years through the following procedure:

1. The Department of Energy would circulate proposed national and regional production goals.
2. The Secretary would provide DOE with his comments, emphasizing possible conflicts between the proposed goals and the Interior Department's missions.
3. The Department of Energy would promulgate its final regional production goals.
4. The regional Department/state coal teams established for activity planning would recommend to the Secretary adjustments to the goals and possible preliminary regional leasing targets after receiving public comments from within their respective regions.
5. On the basis of the teams' recommendations and other information and comments available to the Department and with consideration for the missions of the Department, the Secretary would adjust the DOE goals as necessary and adopt the adjusted goals for the long-term planning guidance of the Department and for the use of states and other agencies. He also would propose the four-year regional leasing targets to be used by the regional coal teams in the formulation or revision of a schedule of sales. (Each schedule would be set for four-years with a revision considered during the second year of its term.)
6. The Secretary would publish his determinations and request comments from the public. He also would consult with the governor of each state to acquire his views of appropriate leasing target levels for the state and region.
7. Finally, on the basis of the comments he receives, the Secretary would adopt regional leasing targets, expressed as tonnages of coal reserves, for the guidance of the regional coal teams. These targets would be made available to the regional coal teams at about the time they begin their task of selecting tracts to propose to the Secretary for lease sale.

In developing its four-year lease sale proposal, a regional coal team may propose a lease sale schedule that does not meet the regional leasing target, but at least one of their alternative schedules should be for the Secretary's regional leasing target. Any recommended divergence from a regional leasing target would not become official unless and until the Secretary formally accepts the recommendation at the time he decides on the lease sale schedule for that region (after completion of the regional lease sale environmental impact statement). Thus, the process of adopting production goals and establishing leasing targets would include consideration of the full range of Federal land management responsibilities and applicable statutory requirements and policies of the states. In considering new regional production goals and leasing targets, the Department would review the analyses in this programmatic environmental impact statement (updated when necessary) and any post-programmatic lease sale environmental impact statements for each region. It would also assess the success of the previous tract delineation, ranking, and selection process in each region; industry surveys; and information developed by other institutions and organizations.

Although the final regional production goals adopted by the Secretary would not be used directly in making Federal leasing decisions during the tract selection process, these regional goals would guide both the Federal and state governments in setting data gathering and planning priorities. These priorities would be established to ensure that a sufficient number of tracts are delineated and enough site-specific information is generated to make the regional tract ranking and selection process workable and to enable the

Department to meet the regional leasing targets derived from those production goals.

The analysis completed on the tracts available but not selected in the previous ranking and selection process for the regions would assist the Department in projecting cumulative impacts of future lease sales. These impacts could then be considered when the Department again considers regional leasing targets. Using this process, the setting of regional leasing targets would supply guidance to the tract ranking and selection process which, in turn, would supply guidance for the next update of the targets.

3.1.1.3 Lease Sales. Each tract selected by the Secretary for lease sale would be analyzed to determine the appropriate fair market value of the coal and the maximum economic recovery requirements. Comments on the fair market value and maximum economic recovery would be taken before the sale.

The method for conducting the sales could vary from sale to sale. One of the main sale differences would be between single tract and intertract sales. In intertract sales, more tracts are offered for sale than would be awarded. The intertract sale is designed to encourage competition over all the tracts when competition for each tract viewed individually may be lacking. At a minimum, this form of sale would be employed for sales involving tracts which would be mined by surface mining methods and which contain a surface estate owned by a surface owner as defined by SMCRA who gave nontransferable consent to mine prior to the enactment of SMCRA.

The responsibility for promulgating regulations concerning the bidding systems to be employed in lease sales belongs to the Department of Energy. In no case would bids for less than fair market value be accepted.

Particular tracts may have been set aside in activity planning for public body or small business special lease sale opportunities. These tracts would be sold in separate sales with only qualified public body and small business firms permitted to bid. In these set-aside lease sales, no bids for less than fair market value would be accepted and no special variation in calculating fair market value would be used. Set aside tracts on which no successful bids are received would be released for the subsequent general sale, if one is scheduled.

The Attorney General would review all successful high bidders for antitrust implications before the leases could be issued. Each lease issued would contain provisions in accordance with regulations promulgated by the Department of Energy to ensure diligent development of the coal and continued operation of the mine.

3.1.1.4 Post-Lease Enforcement of Terms and Conditions. After a lease has been issued, the Office of Surface Mining Reclamation and Enforcement, or, if a cooperative agreement has been signed with the state, the appropriate state agency, would largely be responsible for enforcing the environmental stipulations set forth in the lease and in the mining permit. The mining permit would have to be issued to the lessee jointly by the state agency and the Department of the Interior before mining operations begin. To obtain the permit, the lessee would be required to have a mining plan approved by the Secretary. The lessee would have to file bonds both to ensure that certain financial commitments to the Federal Government are met and to cover the cost of reclamation by the Federal land management agency should the lessee fail to meet all his reclamation requirements. The general post-lease program is discussed in the Final Environmental Statement for the Permanent Regulatory Program under SMCRA [1] and set forth in the permanent regulations of the Office of Surface Mining Reclamation and Enforcement (44 Federal Register 14902-15463, March 9, 1979).

3.1.1.5 Management of Existing Leases. The Department would apply the same land use planning and unsuitability standards to existing nonproducing leases as would be applied to new leases. Such application would respect valid existing rights and substantial financial and legal commitments and other exemptions in SMCRA and other laws. Criteria would be applied to nonproducing existing leases during land use planning. If, however, criteria have not been applied to a nonproducing existing lease prior to submission of a mine plan, they would be applied directly to the lease tract in the mine plan review process.

Under this approach, except where land use planning is conducted, leases on which there is no attempt to achieve production would lapse for failure to meet diligence requirements without the application of criteria. When a mining plan is submitted, the Department would review both

whether the plan is consistent with the reclamation standards of SMCRA and whether coal development is consistent with current planning and unsuitability requirements and stipulations.

Should the review indicate no major problems, the Department would process the mining plan under normal procedures. If major problems exist, however, the Department would seek to work them out with the lessee or reject the mining plan for failure to comply with SMCRA.

Finally, as part of the process of determining the need for new leasing, and in setting the regional production goals and leasing targets, the Department has evaluated, and would continue to evaluate, the production potential from existing producing and nonproducing leases. This evaluation, however, is not as detailed as, nor can it substitute for, the mining plan review for consistency with current planning and unsuitability requirements and reclamation standards.

3.1.1.6 Processing of Preference Right Lease Applications. As with existing leases, the Department would adopt a policy of applying to preference right lease applications the same unsuitability and planning requirements as those applied to new leases. The Department would integrate the determination of consistency with current requirements in the process for determining lease entitlement in which the applicant must show the existence of commercial quantities of coal.

Needed environmental stipulations would be derived after the applicant submits the initial commercial quantities showing. If the final commercial quantities showing is then successfully made, the Department would issue the lease. If not, the application would be rejected.

3.1.1.7 Meeting the Requirements of the National Environmental Policy Act. A regional environmental impact statement would be prepared on a four-year schedule of lease sales in each coal production region shown in Figure 1-1 for which sales of Federal coal are projected. Each regional lease sale statement would include analysis of both the site-specific and intraregional cumulative impacts of the proposed leasing actions. Additionally, mine plan reviews, coal lease exchanges, and other Federal coal management actions might be included where timely and appropriate. The regional leasing target, the tract delineation and ranking process, the proposed selection of tracts to be leased, and the proposed lease sale schedule would be discussed and analyzed. The tract rankings and sales schedule would be reconsidered two years later when the next biennial process of establishing new regional production goals and leasing targets is completed. If, during this reconsideration in any region, substantial differences are found in tract ranking (because of the preparation of additional land use plans or changed environmental, social, or economic conditions) or if there is a new regional leasing target requiring a major change in the tracts proposed for sale, a two-year supplement to the regional lease sale statement would be prepared. At the time of the second consecutive biennial consideration of regional leasing targets and ranking of tracts, new four-year regional lease sale environmental impact statements would be prepared.

National and interregional impacts of the Federal coal management program are analyzed in this programmatic environmental impact statement. The document would be updated when conditions change sufficiently to require new analyses of those impacts.

It is expected that additional environmental impact statements would also be prepared on the individual land use plans of the Bureau of Land Management and Forest Service. As each land use plan addresses all public land resources and uses, not just coal and coal development, the environmental impact statement on the plan would be comprehensive. Concerning coal, the statement would include an environmental impact analysis of any decision in the plan to identify lands as acceptable for further consideration for coal leasing, including the application of the unsuitability criteria and the resource trade-offs which led to the decision.

Presently, the Department is preparing environmental impact statements on eight regions with high coal development potential. These regions are considerably smaller than the coal regions for which the regional coal lease sale environmental impact statements would be prepared under the preferred program (compare Figures 1-1 and 1-2). These ongoing regional statements discuss mining plans for existing leases and related developments. They do not address any renewed competitive leasing which would result from the determination of a need for leasing under the preferred program. Where, however, the analyses in these regional

statements would be applicable to analyses needed in the new regional lease sale statements, they would be incorporated in the new statements.

3.1.1.8 Emergency Leasing and Start-up of the Program. Should any leasing be contemplated in the near future the entire program would be phased in gradually during the first few sales schedules. This phasing -in would be necessitated by budgetary constraints and personnel ceilings. The principal differences between a mature program and start-up procedures would be that, first, the unsuitability criteria would be applied directly to lands which have already been found acceptable for further consideration for coal leasing in existing land use plans and, second, the regional lease sale environmental impact statements would not necessarily include a full four-year sales schedule.

Once the program is in full operation (which could be as early as 1985), situations might arise in which the full planning-through-sale cycle of decisionmaking could not respond quickly enough to avoid causing unfair losses for existing coal operations or the economies of certain locations. To meet these situations, an emergency leasing system, which would develop leases for sale individually, would be a component of the program. This system would use existing land use plans or land use analyses where appropriate and shorten greatly the activity planning stage. No tract, however, would be offered for lease sale under this system that had not been the subject of an environmental assessment, including the application of unsuitability criteria. Emergency lease applications would be considered in cases where Federal coal would be by-passed, where Federal coal is needed to continue existing production or meet existing contract requirements, where failure to lease Federal coal would create a hardship, or where Federal coal would be mined to gain access to other coal deposits. It is expected that the need for emergency leasing would diminish over time. Emergency leasing would not be permitted to substitute for the procedures required in the full preferred program decisionmaking cycle. Emergency applications which are not compatible with existing land use plans would be rejected.

3.1.2 No Federal Leasing

Under this alternative, no new Federal coal would be leased until at least 1985. All preference right lease applications would be rejected where cause for rejection exists, not processed during this period, exchanged for leases for other minerals, or purchased. There would be no leasing for bypass situations or to maintain existing operations. The supply of Federal coal available for development would consist of that coal already under lease, including coal which may have been previously leased under the consent agreement in *NRDC v. Hughes* .

Selection of this alternative implies that the government has decided that leasing is not needed within the planning horizon to 1985. The production under this alternative could reach the same levels as the preferred program or the alternative of leasing to meet DOE production goals since these programs could have outcomes of no leasing in one or more of the study regions.

Compared to the preferred program and other alternatives, the no leasing alternative would likely stimulate the largest number of proposals for development of existing leases for which no mining plans have been submitted. In each such proposal, and after the mining plan is filed, the leasehold would be examined in light of the lands unsuitability criteria. This examination would be carried out through the land use planning system in a fashion similar to that previously described for determining areas acceptable for further consideration for coal leasing. Those leases which are found unsuitable would be revoked using the appropriate, available legal tools. This alternative would also stimulate the largest number of proposals for development of non-Federal coal.

3.1.3 Process Outstanding Preference Right Lease Applications

Under this alternative, the Federal government would process preference right lease applications (PRLAs) and issue leases for those applications which meet the commercial quantities test. However, no other Federal leasing would occur until at least 1985.

Existing leases would be managed as described under the no leasing alternative. The PRLAs would be processed as rapidly as would be administratively feasible. If it were necessary to set

priorities in the processing of PRLAs, the following general guidelines would be applied:

- First, PRLAs in the least environmentally damaging areas.
- Second, PRLAs in areas where coal development needs are greatest as determined by a regional coal needs analysis.
- Third, PRLAs which have been on file for the longest period.

Choice of this alternative would require that those PRLAs in areas which are determined environmentally unacceptable, but which still meet the commercial quantities test (with proper environmental stipulations applied), would either have to be purchased or otherwise acquired (e.g., through lease exchanges permitted by statute).

As with the no leasing alternative, this alternative is not necessarily inconsistent with the preferred program or with the alternative of leasing to meet DOE production goals; leasing level targets under those alternatives could be met with coal from PRLAs.

The surface owner consent provisions of SMCRA do not apply to PRLAs. Environmental analysis to comply with NEPA could be done on a case-by-case basis.

3.1.4 Emergency Leasing

This alternative would provide for limited competitive leasing. Emergency leases would include the relatively small amounts of Federal coal which could be leased to avoid bypassing Federal coal or to maintain existing operations. Bypass situations arise where Federal coal occurs in small blocks which adjoin areas where mines are already operating and which, if not leased, are not likely to be mined at all. Leasing of PRLAs would be permitted only if they meet either the bypass or existing operations criteria. These limited leasing criteria would be similar to current criteria for short-term leasing under the modified order in *NRDC v. Hughes* . The maximum amount of bypass coal eligible for any single lease under this alternative would be that agreed to under the court order (i.e., five years of production at existing rates). Similarly, the maximum amount of coal that would be leased to maintain an existing operation would be defined by that order (eight years of production at existing rates). As with the two previous alternatives, this alternative precludes other new competitive Federal coal lease sales, at least until 1985, with a review of the need for new leasing anticipated then. Existing leases would be managed as described under the no leasing alternative.

In specifying this alternative, the elegibility of existing operations to lease additional Federal coal to maintain production would have to be restricted. The restrictions decided on were that the mining operation must have been in existence at least five years and must not have previously obtained a new Federal lease in order to maintain the existing operations. This decision, however, will have to be reviewed if the Secretary elects this alternative. It should be noted that these restrictions in some respects are tighter than the comparable short-term leasing criteria under the *NRDC v. Hughes* order, wherein mines must only have been operating by September 1977 to be eligible to lease Federal coal on a short-term basis.

The surface owner consent provisions of Section 714 of SMCRA would apply and, where appropriate, lands unsuitability criteria and general planning analysis would be required. Site specific environmental analysis would be carried out separately and not included in any regional environmental impact statements.

3.1.5 Lease to Satisfy Industry's Indications of Need

This alternative is effectively the Energy Minerals Activity Recommendation System (EMARS II), as proposed by the Department in the September 19, 1975, final environmental impact statement on the Federal coal leasing program. Certain changes must be made to bring the program into compliance with the Federal Land Policy and Management Act of 1976, the Federal Coal Leasing Amendments Act of 1976, and the Surface Mining Control and Reclamation Act of 1977.

Under this alternative, during the early stages of land use planning industry would first be asked to nominate those tracts it is interested in leasing. At the same time, the public would be asked to indicate those areas where leasing should be restricted. Coal demand estimates formed from the sum of the industry nominations would serve as a development restriction. Such information would then be processed through the land management agencies' planning systems to determine whether the specific tracts are environmentally acceptable

and whether coal development represents an efficient and proper use of the land. Tracts which are judged acceptable would then be offered in a future lease sale. Each tract receiving a high bid equal to or above fair market value as determined by the Department would be leased to the high bidder.

Major differences between this alternative and the preferred program are that land use planning would not be required to precede tract delineation, regional environmental and socio-economic concerns would not weigh as heavily in the location of tracts for sale, and more leasing than needed by the market might take place because of speculative interest in leases.

Existing leases and PRLAs would be managed as described earlier. This alternative would also include procedures for emergency leasing of small tracts as described earlier. NEPA compliance could proceed as under the preferred program. The surface owner consent provisions of Section 714 of SMCRA would apply. Regional environmental impact statements would not be prepared, and the tracts would be analyzed in the environmental impact statements on land use plans.

3.1.6 State Determination of Leasing Levels

Under this alternative, the states would have the responsibility to determine the timing and extent of new Federal leasing. There are many procedural structures that could be used to implement this alternative. The states, rather than the Secretary with state consultation, could select and rank tracts from areas acceptable for further consideration for coal leasing as determined through the Federal land management agencies' land use planning systems. States would determine a lease sale schedule; thereafter, the appropriate BLM state office would conduct the sale. The states would have veto power over which leases would finally be issued.

A second possible structure would be to transfer all land use planning and environmental analysis functions to the appropriate state planning office. The Department would retain only the responsibility to conduct lease sales and to issue leases. Both structures would require Congressional action to amend the governing statutes, especially FLPMA and SMCRA.

Existing leases and PRLAs would be managed as described before, but the states could have a final veto on the acceptability of any area for coal mining and could have responsibility for approval of mining plans for Federal coal. Furthermore, it is assumed that this alternative would include an emergency leasing component. States would be delegated the responsibility to obtain appropriate surface owner consents.

The Department chose this alternative and its variations for analytical purposes only. The alternative and its variations have not been formally requested by the states themselves, although they were consulted to assess the comparative impacts of the alternative. To conduct an environmental impact analysis of this alternative it was necessary to solicit statements of present preferences for leasing levels from the states. The Department requested each western state with substantial reserves of unleased Federal coal to specify what production levels it would like to see analyzed for 1985 and 1990. All but two states provided their own production levels to be used for the analytical purposes of this environmental impact statement. The State of Colorado chose to specify production levels equivalent to the DOE mid-level estimates. The State of Utah preferred not to specify any production levels and indicated that the DOE estimates for Utah are extremely suspect.

3.1.7 Lease to Meet DOE Production Goals

Under this alternative, DOE regional production goals would drive the tract selection system. DOE would select the regional leasing targets. Although the same amount of leasing might result from some of the previously described alternatives, this alternative would focus specifically on the DOE national production projections and would not allow for any adjustment in those projections. Areas acceptable for further consideration for coal leasing would be defined in the land use planning processes as described in the preferred program. New leasing needs in a region would be calculated by first estimating for a future period the difference between DOE production goals and currently committed coal production. Estimates would then be made of the amount of coal needed to fill potential production gaps that could be supplied from existing Federal leases and non-Federal coal. Estimates of the potential production from existing leases and non-Federal coal would take into account the application of unsuitability criteria to existing leases and the relative costs of mining both

sources of production. The remainder of the gap would then have to be met by coal production from new Federal leases.

Under this alternative, PRLAs would be processed as described under the preferred program. The amount of new competitive leasing planned for regions would be adjusted for the amount of reserves in PRLAs expected to be leased. The adjustment would take into account whether PRLA reserves were the least costly to mine, the type of coal needed, environmentally acceptable locations, and other factors.

This alternative would include an emergency leasing component. Environmental impact statements would be prepared as under the preferred program. The surface owner consent provisions of Section 714 of SMCRA would apply.

3.1.8 Other Alternatives Not Considered

The EMARS I proposal is not separately analyzed as an alternative in this statement. The basic principal of EMARS I, that coal development on Federal lands should stem from government interests, is a primary factor in the lease to meet DOE production goals alternative and in the preferred program, which relies on both coal need projections and ways to modify these projections in response to environmental, state government, and other concerns. Other EMARS I elements were either never articulated or superceded by subsequent legislative changes.

The alternative of development of Federal coal resources by the Federal government is not discussed in this statement. Although such an alternative was mentioned in the 1975 programmatic environmental impact statement, it is unlikely the Congress would approve legislation removing the responsibility for developing coal on Federal lands from the private sector. The alternative is unreasonable and does not need to be analyzed.

3.2. DETAILED DESCRIPTION OF CERTAIN COMPONENTS OF THE PREFERRED PROGRAM AND ITS DEVELOPMENT

This section provides a more detailed presentation of certain components of the preferred Federal coal management program. It also includes a discussion of the process of developing the preferred program and certain statutory requirements which have affected the program's design. Figures 3-2, 3-3 and 3-4 display fully the major steps in the preferred program.

Each discussion of a component of the preferred program in this section notes where the component is unique to the preferred program and where it is compatible with other alternatives.

3.2.1. Development of the Preferred Program

Shortly after assuming the post of Secretary of the Interior, Secretary Andrus requested a review of the status of Federal coal leasing, including the lack of new leasing, the 1975 proposed leasing program, the new statutory base for leasing, and the *NRDC v. Hughes* suit. The reviewers found that the 1975 program had been outdated by the new statutes and, furthermore, was not compatible with the policy objectives of the new Administration; that the plaintiffs' arguments in the law suit were likely to prevail; and that significant, new Federal leasing probably could not and, moreover, should not begin until a new Federal coal management program which complies with the law and meets Presidential and Departmental policy objectives is prepared and the need for renewed leasing is assessed.

Responding to these findings, the Secretary ordered a full-scale interagency coal policy review which, among other things, would assess the need for leasing and initiate the development of a new Federal coal management program. A review committee, composed of the Solicitor and Assistant Secretaries of the Department was formed. The Office of Coal Leasing, Planning, and Coordination was established at the Departmental level to coordinate the review. Three events in 1977 gave impetus to the review: the April 29 publication of the National Energy Plan which emphasized coal as the principal domestic fuel to reduce our dependence on imported oil and gas and called for a doubling of coal production by 1985; the President's May 23 Environmental Message to the Congress and May 24 Memorandum to the Secretary which called upon the Secretary to develop an environmentally sound coal management program; and the September 27 decision in *NRDC v. Hughes* enjoining the Department from engaging in major leasing activity until certain conditions were met (see Chapter 1 for a discussion of these events).

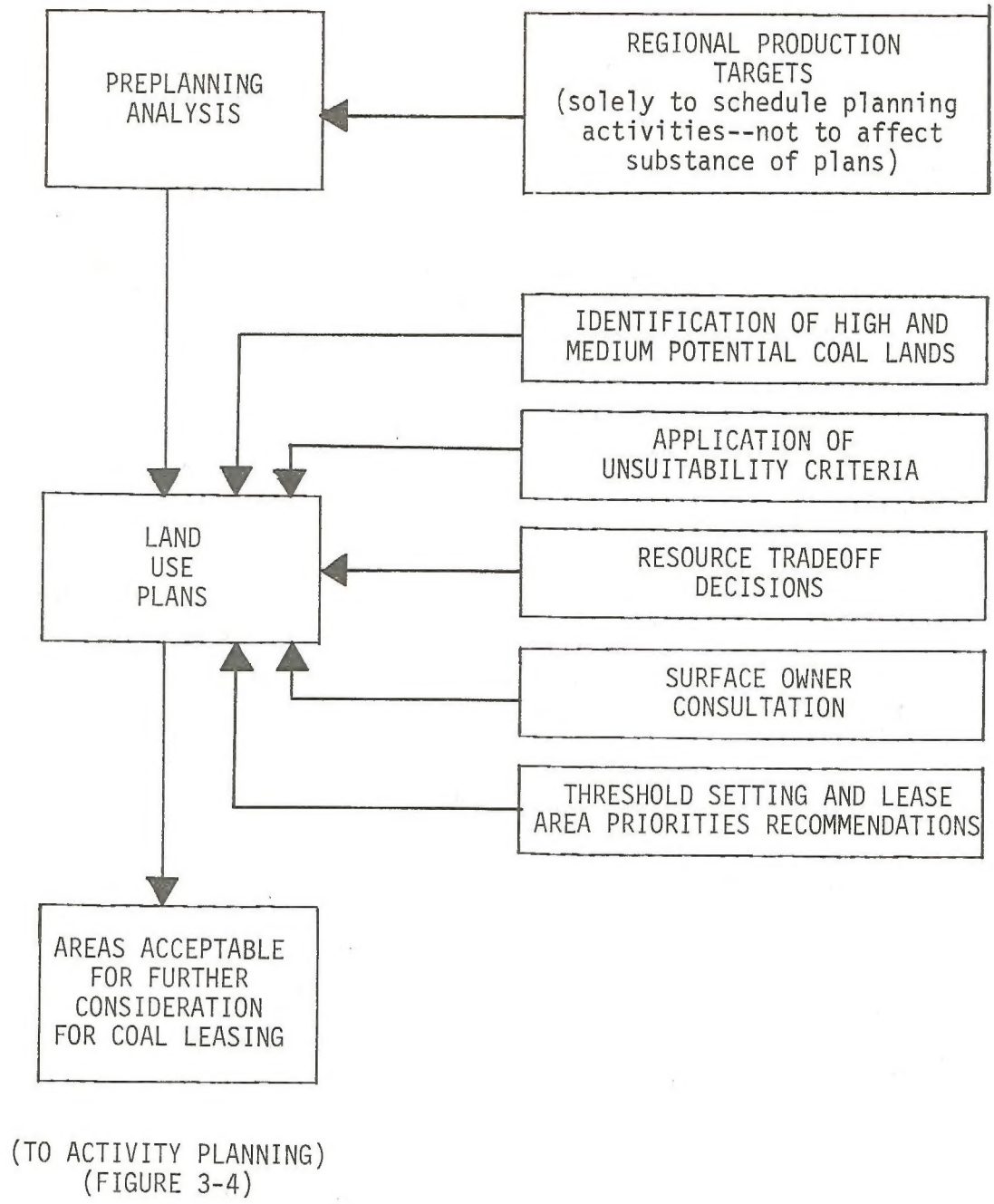


FIGURE 3-2

PREFERRED PROGRAM: BLM LAND USE PLANNING PROCESS

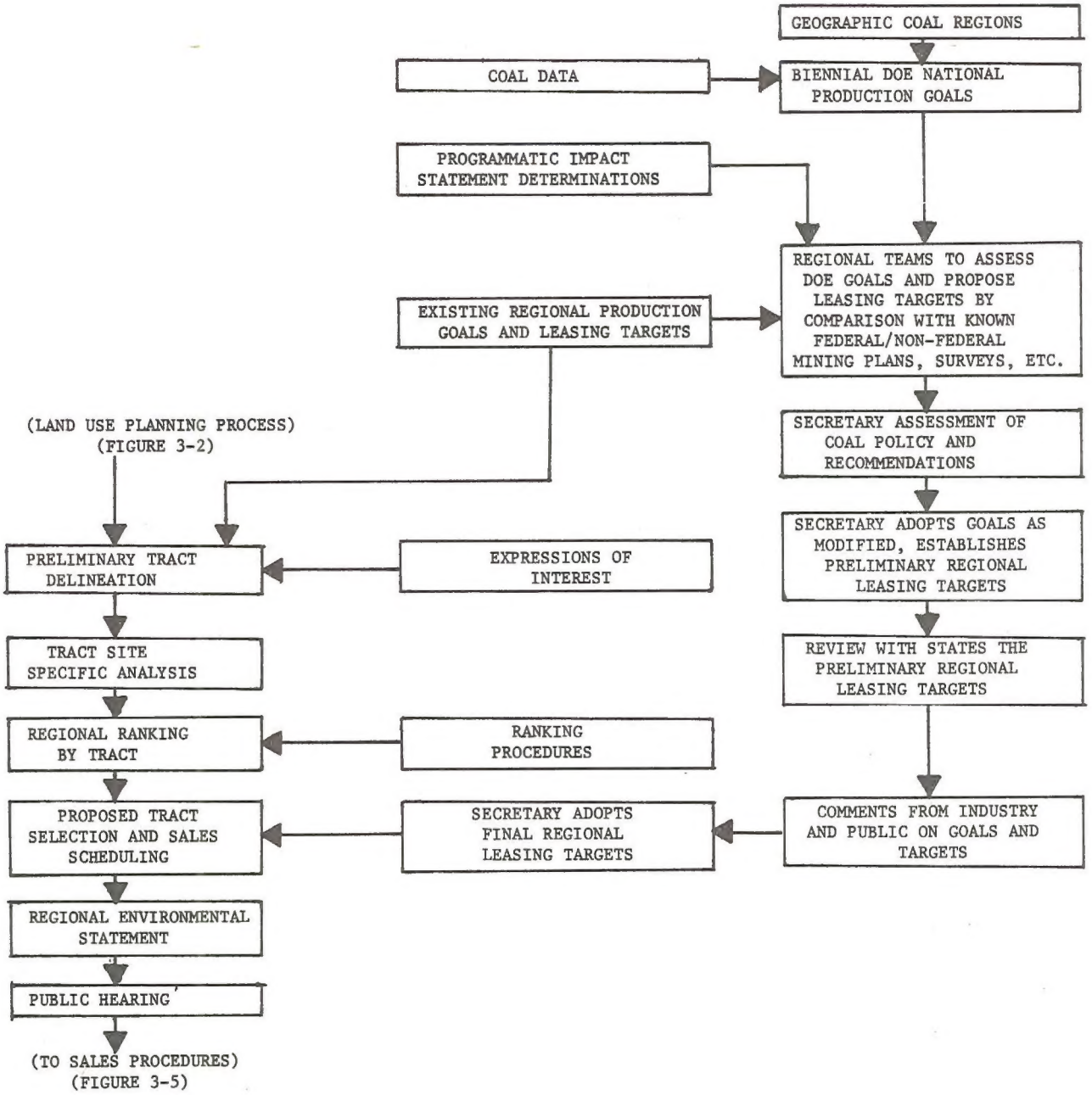


FIGURE 3-3

PREFERRED PROGRAM: ACTIVITY PLANNING PROCESS

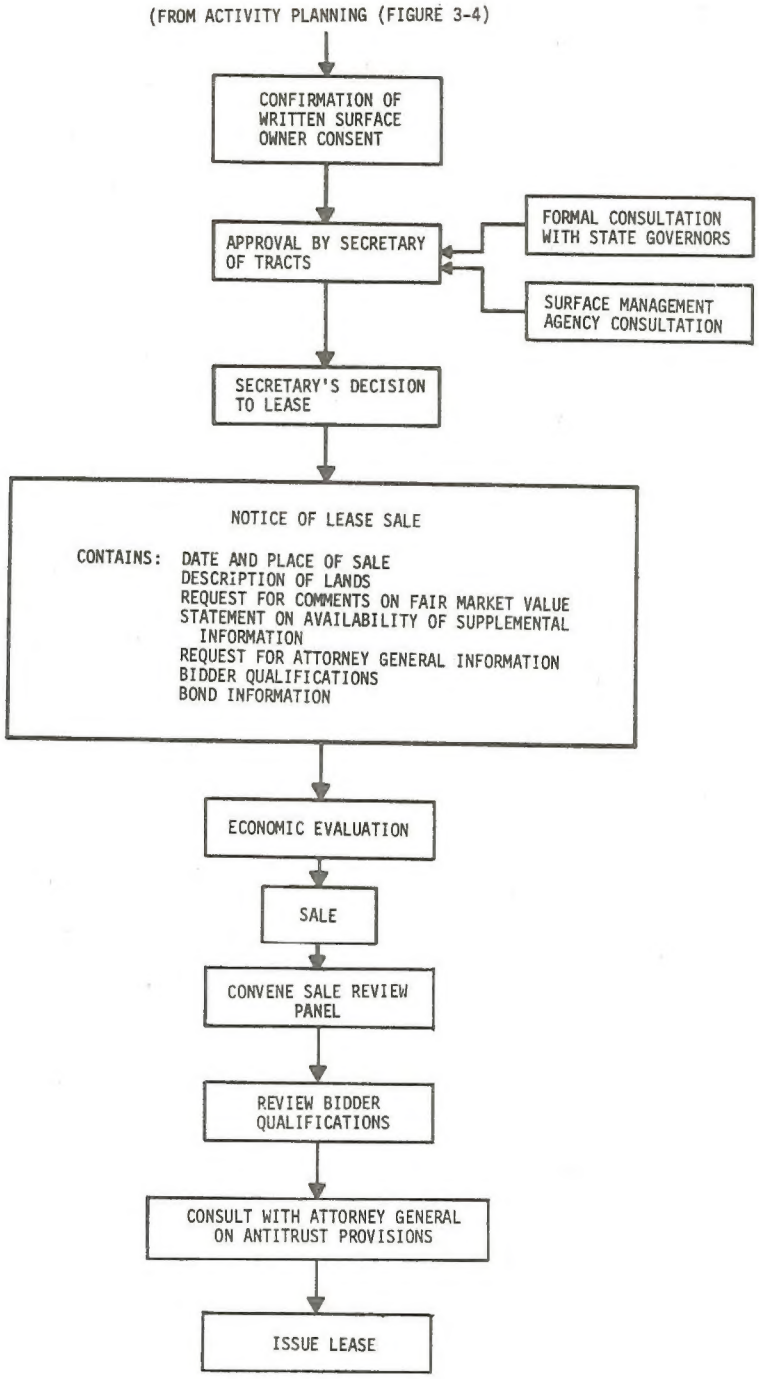


FIGURE 3-4

PREFERRED PROGRAM: SALES PROCEDURES

The process of selecting the preferred new Federal coal management program began in October 1977 and continued through March 1979. The first step in the process was the convening of task forces assigned to specific issue areas. These task forces were staffed with coal, land use planning, and other specialists drawn mostly from the Bureau of Land Management, the Geological Survey, the Fish and Wildlife Service, and the Office of Policy Analysis. Each task force produced a background issue paper which was made public and continues to be available from the Bureau of Land Management upon request. The Office of Coal Leasing, Planning, and Coordination reviewed these papers and from them prepared concise issue option papers which were submitted to the Secretary or Under Secretary. (These issue option papers, listed in Table 3-1, were also made public and continue to be available from the Bureau of Land Management upon request.) The Secretary or Under Secretary circulated the issue option papers to the Assistant Secretaries and the Solicitor for comments and recommendations on which issue options should be selected. After all comments and recommendations were also circulated among the Assistant Secretaries and the Solicitor, they or their representatives met and discussed the comments and recommendations with the Secretary or Under Secretary. The Secretary or Under Secretary subsequently selected the option he preferred under each issue presented to him in the issue option paper or papers then under consideration.

On October 26, 1977, the Secretary considered the general question of when in the planning process should the Department solicit information from the coal industry regarding where they would prefer to have leases offered. On June 30, 1978, the Secretary addressed numerous issues of which the principal one was how should the need for leasing and the levels of leasing be determined and by whom. The six options not preferred by the Secretary became the basis of the six alternatives to the preferred program which are analyzed in this statement. Also selected on that date were options under issues concerning single tract and intertract sale methods, bidding systems, state and public participation procedures, site specific analysis and lease stipulations requirements, the definition of "maximum economic recovery", regulation of the end uses of Federal coal, a program for public body leasing, and the management of non-producing existing leases and preference right lease applications. The Under Secretary selected options on issues concerning procedures in land use and activity planning on July 28, 1978, and on issues concerning the preparation of environmental impact statements and the implementation of the statutory surface owner consultation and consent requirements on September 15, 1978. On October 3 and November 2, 1978, the Under Secretary selected preferred criteria (and exceptions) for designating Federal coal lands unsuitable for mining. Finally, on March 2, 1979, in response to public comment on the draft version of this statement and further analysis in the coal policy review, the Under Secretary expressed a preference for the use of Department/state regional coal teams in activity planning and for certain changes in surface owner consultation and consent procedures. (The issues and options considered by the Secretary and the Under Secretary, the benefits from and the detriments to each option, the issue option papers which set forth the options and contain the discussion of the benefits and detriments, the option preferred, and the date the preference decision was made are summarized in Table 3-2.)

The preferred program described in Section 3.1.1. and discussed in greater detail below was developed by the Office of Coal Leasing, Planning and Coordination from the policy options perferred by the Secretary or the Under Secretary. Further work in determining procedural details for the preferred program and several of the other alternatives is being accomplished by 23 task forces composed of representatives of various agencies of the Department and of the Office of Leasing Policy Development of the Department of Energy. These task forces were established shortly after the publication of the draft version of this statement on December 15, 1978, and most of their work is already reflected in the proposed regulations set forth in Appendix A and in changes in the text of this chapter from Chapter 3 in the draft statement.

3.2.2. Land Use Planning.

As previously noted, in the preferred program the land management agencies' land use planning systems and The Bureau of Land Management's coal activity planning process are to provide the

TABLE 3-1

ISSUE OPTION PAPERS PREPARED TO IDENTIFY
PREFERRED PROGRAM ALTERNATIVE

Issue Option Papers*	Paper Date	Decision Date
Option Paper for the Secretary: Departmental Approach for the Long-Term Coal Leasing Program	Sept. 20, 1977	Oct. 26, 1977
Need for Leasing/Leasing Systems Choice	June 23, 1978	June 30, 1978
Bidding Systems	June 23, 1978	June 30, 1978
Setting of Environmental Conditions and Lease Terms	June 23, 1978	June 30, 1978
State and Local Government Participation	June 23, 1978	June 30, 1978
Public Participation	June 23, 1978	June 30, 1978
Maximum Economic Recovery	June 23, 1978	June 30, 1978
Coal Leasing: Surface Owner Consent	June 23, 1978	June 30, 1978
Leasing for Limited End Uses	June 23, 1978	June 30, 1978
Public Body Leasing	June 23, 1978	June 30, 1978
Management of Preference Right Lease Applications	June 23, 1978	June 30, 1978
Management of Existing Leases	June 23, 1978	June 30, 1978
Intraregional Matters Affecting Design of a Leasing Process	July 18, 1978	July 28, 1978
Environmental Analysis Strategy	Aug. 31, 1978	Sept. 15, 1978
Split Estate Leasing Implementation	Aug. 31, 1978	Sept. 15, 1978
Land Unsuitability Criteria	Sept. 22, 1978	Oct. 3, 1978
Proposed Additional Unsuitability Criteria	Oct. 30, 1978	Nov. 2, 1978
State Participation in Activity Planning in Preferred Coal Management Program	Feb. 27, 1979	March 2, 1979
Surface Owner Consent Procedures	Feb. 27, 1979	March 2, 1979

* All issue option papers are available from the Department upon request.

TABLE 3- 2

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS (a)	PROS AND CONS (b)	PAPER AND DATE/COMMENTS
When during the planning process should the Department solicit information from the coal industry regarding where they would prefer to have leases offered?		
1. Before multiple-use tradeoff and unsuitability decisions are made.	(+) Incorporates market information into land use planning. (+) Incorporates industry's resource information into land use planning. (-) Eliminates some coal resource areas which otherwise would pass unsuitability and tradeoff screens but in which industry is not interested (-) Overbalances tradeoff decision in favor of coal.	Paper: "Option Paper for the Secretary: Departmental Approach for the Long-Term Coal Leasing Program," September 26, 1977. Decision: Option 3; October 26, 1977.
2. Do not solicit any information.	(-) Government would have to seek out resource and market information industry has already. (-) Mines likely to be located at sites that are not efficient for the industry. (-) Could bias BLM planning toward noncoal surface resources.	
3. Do not use industry information until areas acceptable for further consideration for leasing have been identified, then use industry information in tract delineation, ranking, and selection process.	(+) Industry will have strong voice in selection of tracts, but only in areas known to be acceptable for further consideration for leasing. (+) Incorporates market information into activity planning. (-) BLM multiple-use resource decision cannot be made for coal without coal "demand" estimate.	Secretary indicated, however, that BLM should accept industry comment at any time in process.
Is new coal leasing needed; if so, what should be the general structure of a new Federal coal management program?		
1. No Federal leasing until at least 1985.	(+) Low administrative burden. (-) Low assurance of meeting NEP goals. (-) Low assurance of leasing least-cost coal. (-) Shifts environmental impacts to non-Federal lands. (c)(0) Shifts coal production to East.	Paper: "Need for Leasing System Choices," June 23, 1978. Decision: Option 7; June 30, 1978. (See also Sections 2-7, 2-8, and 2-9 of this statement.)
2. No Federal leasing, but process preference right lease applications.	(+) Moderate to low administrative burden. (-) Low assurance of meeting NEP goals. (-) Low assurance of leasing least-cost coal. (-) Low capability to incorporate environmental considerations. (c)(0) Shifts coal production to East.	
3. Emergency leasing only (bypass and maintain existing production) (Suboption would allow limited new mine leasing).	(+) Moderate to low administrative burden. (-) Low assurance of meeting NEP goals. (-) Low assurance of leasing least-cost coal. (-) Low capability of incorporating regional environmental considerations. (-) Restricts new-entrants to coal industry.	
4. Lease to satisfy industry needs.	(+) High assurance of meeting NEP goals. (+) High assurance of leasing least-cost coal. (+) Low administrative burden. (-) Low capability to incorporate regional environmental considerations. (-) Low capability to mitigate social and fiscal impacts.	

(a) The options have been edited to clarify their presentation in this Table.
(b) Note the pros and cons have, in some cases, been reduced by deleting repetitious arguments, i.e., where an advantage of one option is a disadvantage of other options because it is lacking from them. Also in a few cases where the comments of the Assistant Secretaries developed pros or cons which were not in the original papers but that weighed significantly in the decision, these arguments have been added. Readers are requested to refer to the papers cited for a full description of issues, options, and pros and cons. Papers are available upon request to the Department of the Interior.
(c) Neutral, neither pro nor con from a national perspective.

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
5. Let States determine level of leasing directly through final veto.	(-) High administrative burden. (-) No assurance of meeting national priorities without central decision maker. (-) Secretary abandoning resource responsibilities. (0) High weight on mitigating local fiscal and social impacts.	
6. Lease to meet or exceed DOE production projections.	(+) High assurance of meeting NEP goals. (+) High assurance of leasing least-cost coal. (-) Moderate ability to mitigate social, fiscal, and environmental impacts. (-) Secretary abandoning resource responsibilities.	
7. Merge DOE production projections with inputs from States, local governments, industry, and interest groups to derive DOI regional production targets.	(+) High assurance of meeting national NEP goals. (+) High assurance of leasing least-cost coal. (+) High ability to mitigate social, fiscal, and environmental impacts. (-) Moderate-to-high administrative burden.	
What sale system should the Department adopt?		
1. Lease using single tract system (require separate sales for each tract).	(+) Easiest system to administer. (+) Allows for more definitive activity planning and sale schedule proposal. (+) Greater assurance of leasing where the Department feels is best. (-) Where little competition involved, puts heavy reliance on fair market value.	Paper: "Bidding Systems," June 23, 1978. Decision: Option 3; June 30, 1978.
2. Lease using intertract system (offer several tracts in a sale, lease only those with highest bid).	(+) Maximizes revenue by maximizing competition. (+) Offering large number of tracts lessens chance of appearing to favor any one party. (+) Greater opportunity for operation of industry preference. (-) More complex to administer. (-) Proposal action difficult to define for EIS. (-) Time, money, and manpower spent on tracts not sold, but these tracts can be used in later sales.	
3. Retain discretion to use either.	(+) Allows Department to gain experience with intertract concept. (+) Gives Department means to deal with various ownership patterns. (-) Department expends effort on developing two systems rather than one, complicates program.	
Should the current deferred bonus bidding system be used exclusively or should the Department experiment with other bonus bidding systems?		
1. Continue to use deferred bonus bidding system exclusively.	(+) Administratively simple. (+) Department has experience with system. (+) Risk factor in coal not as great as in OCS. (-) Might increase front end cost burden on coal companies. (-) Deferred bonus bidding may favor large over small companies.	Paper: "Bidding Systems," June 23, 1978. Decision: Option 2; June 30, 1978.
2. Experiment with alternative bidding systems and adopt those successful.	(+) Allows greater flexibility to meet varying situations. (-) Complicates administration of program.	
What form of final pre-sale State consultation should the system adopt (choices in addition to consultation occurring during planning and tract selection)?		
1. Only consult if tract is for surface mining in National Forest (statutory requirement).	(+) Easiest option to administer. (+) Follows letter of statute. (-) Would reduce consultation from current practice. (-) Artificially stresses National Forest coal.	Paper: "State and Local Government Participation," June 23, 1978. Decision: Option 2; June 30, 1978.
2. Consult on all tracts with an optional response period of from 30 to 60 days except for mandatory period on National Forest.	(+) Allows Secretary to respond when serious concern seems likely, but otherwise to proceed with timely sale. (+) Assures States will be allowed to present case to Secretary. (-) Greater administrative burden than #1. (-) Introduces delay into sales.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND/DATE COMMENTS
3. Extend statutory privilege to all lands.	(+) Maximizes state opportunity for participation. (-) Potential to introduce delay into system great (up to 8 months) and would have delayed even if States did not desire it.	
What should be the role and scope of the site specific analysis and the resulting stipulations?		
1. Analysis and stipulations based only on planning data should be included at the time of lease sale. Rely on mining plan to develop specific site stipulations.	(+) Applicant bears data cost. (+) May shorten time to go from land use plan to sale. (-) Increases risk to bidder of non-operable or expensive lease. (-) Could result in EIS being needed for mining plan.	Paper: "Setting of Environmental Conditions for Lease Terms," June 23, 1978. Decision: Option 2 June 30, 1978.
2. Develop sufficient information prior to leasing to answer basic environmental and economic questions (i.e., reasonable certainty that tract will meet SMCRA standards) but may proceed with less information than needed for mining plan. Stipulations are to be detailed, must require compliance with SMCRA, and be subject to change in response to new information from mining plan.	(+) Reduces risk of offering for sale deficient tract. (+) Clarifies pre-lease and mining plan analysis objectives. (-) Imposes additional cost and time on system. (-) May inhibit mining plan manager from adding needed additional stipulations.	
3. All lease stipulations should be formulated at the time of lease sale and detailed data must be available then.	(+) Gives industry greatest assurance that mining will be permitted under lease without new costs to meet later stipulations. (-) Very high data costs before certain tract will be sold. (-) Lengthens time for tract selection significantly.	
When should mandatory public hearings occur in system?		
1. Prior to adoption of land use plan, and/or 2. After draft regional environmental assessment, and/or 3. After final environmental impact analysis and before sale.	Generally, the Department should maximize public comment opportunity. However, effectiveness of public hearings decreases as more hearings are held. Probability of comments causing change in material presented declines the further into the process the hearing is held.	Paper: "Public Participation," June 23, 1978. Decision: Options 1 and 2; June 30, 1978.
How should the Department define and apply the phrase "Maximum Economic Recovery" (MER)?		
1. Calculate maximum economic recovery on a seam-by-seam basis (If seam is profitable it must be mined).	(+) Bonus bids will be higher than for Option 2 since less cost to operate. (+) Lower susceptibility to coal price decrease. (-) May "lose" marginal seams from supply. (-) More acreage leased. (-) Increases potential for double opening of same ground.	Paper: "Maximum Economic Recovery," June 23, 1978. Decision: Option 2; June 30, 1978.
2. Calculate maximum economic recovery on basis of all seams in land (all seams which collectively are profitable must be mined) with consideration for social and environmental costs.	(+) Less acreage disturbed. (+) Greater conservation of resource. (-) Potential for subsidence is high because of deep mining that may be required. (-) Increased economic cost to society. (-) High administrative burden.	
3. Use engineering practice to guide determination.	(+) Uses expertise of mining supervisor. (+) Pre-lease analysis is simplified. (-) Could result in lower production rates. (-) Could result in litigation. (-) Judgments could be of varying quality and probably not consistent.	
Should stipulations on the end uses for the coal be part of the process?		
1. Use stipulations to restrict technology or location of final use permitted for coal mined from Federal tracts.	(+) Gives program additional means to mitigate social/fiscal/environmental impacts. (-) Legal basis has not been adequately researched. (-) Greater administrative burden.	Paper: "Leasing for Limited End Uses," June 23, 1978. Decision: Option 3; June 30, 1978.
2. Use end-use stipulations only in support of special opportunity bidding programs.	(+) Strengthens statutorily required program without extending into new areas of regulation. (-) Legal basis has not been adequately researched.	
3. Defer for further study.	(+) Allows for more study needed of this question. (-) Poses some risk to programmatic EIS.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
What policy posture should the Department take toward public body leasing?		
1. Keep "public body" leasing program to the minimum size possible while still satisfying the Federal Coal Leasing Amendments Act of 1976.	(+) Least program cost and complexity. (+) The larger operations of private coal operators are easier to adopt to environmentally desirable operations. (-) Lose benefits of "public body" participation.	Paper: "Public Body Leasing," June 23, 1978. Decision: Option 2; June 30, 1978.
2. Treat "public body" leasing as a major component of the system and encourage "public body" participation, but do not modify fair market value requirements or provide other financial incentives.	(+) Presents competition for private coal operators. (+) Can be accomplished without any major adjustments to system timing. (-) BLM would have to maintain two separate leasing systems and continually audit public body coal use.	
3. Treat "public body" leasing as a major component of the coal leasing program and encourage use.	(+) Ensures relatively low cost coal to "public bodies." (-) Risks appearance of favoring "public body" leasing without adequate mandate. (-) Higher administrative costs.	
How should the Department manage preference right lease applications (PRLAs)?		
1. Continue current practive (no review for consistency with land use plans or unsuitability criteria).	(+) Least administrative burden. (+) Avoids possible controversy. (-) Could result in mining in areas that would be unsuitable under new coal management program. (-) Postpones desirability question to mining plan stage. (-) Does not satisfy President's request to scrutinize PRLAs.	Paper: "Management of Preference Right Lease Applications," June 23, 1978. Decision: Option 3; June 30, 1978.
2. Reprocess PRLAs in light of land use planning and unsuitability criteria prior to engaging in commercial quantities determination.	(+) Would develop better understanding of how much coal would be forthcoming from PRLAs. (+) Meets President's request. (+) Assures consistent review. (-) Faces probable legal challenge by present holders of applications. (-) Adds to administrative complexity of coal management program. (-) May study applicants that cannot make showing.	(The Secretary also indicated that the Department should proceed to identify the least harmful twenty PRLAs and proceed to process them under the NRDC v. Hughes agreement.)
3. Reprocess PRLAs and determine commercial quantities simultaneously. Review each application to decide whether it meets current planning and unsuitability criteria. Use appropriate tools to avoid undesirable development.	(+) Meets President's request. (+) By combining work should be less costly than under Option 2. (+) Offers increased chance of timely production. (-) Open to possible legal challenges. (-) Adds to administrative complexity of program.	
How should the Department manage non-producing existing leases?		
1. Review all non-producing leases (regardless of production plans) to decide if the leases could be operated in an environmentally acceptable manner. Use appropriate tools to avoid undesirable development.	(+) Gives the Department best estimate of how much coal might be produced and need for new leases. (-) High administrative costs. (-) May process some leases that would not be developed.	Paper: "Management of Existing Leases", June 23, 1978. Decision: Option 2; June 30, 1978. Expanded by: Paper: "Land Unsuitability Criteria", September 22, 1978. Decision: October 3, 1978.
2. The Department would await the fulfillment by the lessee of the legal obligations required to initiate mining (submission of a mining plan) before reviewing the desirability of lease development. (This does not preclude evaluation as part of the normal planning process.) The new planning requirements and unsuitability criteria would be applied to all non-producing leases. The mine plan would be reviewed in light of the unsuitability criteria to determine which, if any, apply. If any criterion applies, the specific criterion and any exception to it which the conditions permit to be applied would be identified. If a criterion does not apply and the conditions do not permit an exception, a further decision would be made on whether the land is exempt from the criterion because of the source of the authority for the criterion.	(-) Uncertain legal environment. (+) Maintains consistency with new leasing where possible. (+) Moderate administrative costs. (-) Does not resolve planning uncertainty surrounding existing leases. (-) High cost to lessee.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
How will regional targets be used in the management system?		
1. Targets enter planning process at MFP stage and serve as constraint for resource tradeoffs.	(+) Provides explicit guidance for tradeoff planning decisions. (+) Makes coal consistent with planning for other resources being managed. (-) No flexibility for regional tradeoffs. (-) Makes least use of industry information. (-) Might require more frequent cycling of land use plans. (-) Intertract sales would not be possible.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process", July 18, 1978. Decision: Option 2; July 28, 1978.
2. Targets used at point of regional tract selection.	(+) Allows maximum flexibility for intraregional tradeoff. (+) Does not require frequent recycling of land use plans. (+) Allows intertract bidding. (-) Places heavy emphasis on untried unsuitability concept. (-) Changes BLM resource decision process.	
3. Targets with safety factor multiplier enter at land use plan level and goals used at regional level.	(+) Target available for guiding land use plan decision. (+) Develops pool of possible tracts for possible use in intertract sales. (-) Could be seen as developing unneeded tracts. (-) Disaggregation of targets to planning unit level difficult.	
How should industry tract interest information be used?		
1. Used to delineate tract boundaries only after "best" areas are identified.	(+) Department could not be seen as reacting to industry. (-) Ignores opportunity to use valuable industry information. (-) May result in development of tracts that are not least cost or that are of no interest to industry.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process", July 18, 1978. Decision: Option 2; July 28, 1978. (See also decision of October 26, 1978)
2. Used to select "best" leasing tracts from areas acceptable for further consideration for leasing.	(+) Allows the party who ultimately will be mining a bigger role in identifying areas for lease.	
Should lands unsuitability criteria be adopted by Department?		
1. Criteria should be adopted by Department.	(+) Assures consistency among field units. (+) Provides local land managers a standard. (+) Provides a mechanism for assessing cumulative impacts of statutory regulation and policy. (+) Higher level of public visibility. (+) Provides greater compatibility with State programs. (-) Decreases flexibility at local level. (-) May require administrative changes and costs. (-) Rigid application might restrict tract availability.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process", July 18, 1978. Decision, Option 1; July 28, 1978. (See October 3, 1978, Decision).
2. Criteria should not be adopted so that maximum discretion is exercised at field level.	(+) No changes needed in existing planning procedure. (+) Risks of new system avoided. (-) Secretary has less assurance local land tradeoffs reflect major national preferences. (-) No consistent mechanism for use on PRLAs and existing leases.	
Should regional comparisons be based on areas or specific lease tracts?		
1. Rank by areas.	(+) Ranking process is more meaningful with larger geographic area. (+) Less open to charges of favoritism to any one company. (-) More diverse information to assess. (-) Requires all plans on same schedule. (+) Allows use of industry information.	Paper: "Intraregional Matter Affecting Design of a Coal Leasing Process," July 18, 1978. Decision: Option 3; July 28, 1978.
2. Rank by tracts.	(+) Ranking should cost less. (-) Requires all plans on same schedule. (-) Closer identification with specific coal companies.	
3. Rank by both areas and tracts "Ranking factors will include many values, including environmental".	(+) Does not require all planning to be on same schedule. (+) More flexibility to field managers. (-) Some loss in consistency of ranking.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S OPTIONS

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
Should coal leasing be restricted to areas identified in CRO/CDP maps?		
1. Require only that coal leases be issued within KRCRAs.	(+) Would make the widest area available for consideration. (-) Department might end up trying to lease tracts with inadequate knowledge of value of coal deposit.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process," July 18, 1978. Decision: Option 3; July 28, 1978.
2. Lease only in areas identified as high or medium coal development potential by the CRO/CDP maps.	(+) Ensures consistent coal data. (-) Pressure would be applied to increase CRO/CDP effort, increasing costs.	
3. Require only that coal leases be issued within KRCRAs but retain coal quality as a ranking factor and use CRO/CDP maps for information.	(+) Makes widest area available for consideration. (+) Encourages use of CRO/CDP data for consistency. (-) Possibility for inconsistency in coal data use.	
Should the Department adopt a policy of preferring either clustered or dispersed leasing patterns within a region?		
1. Adopt policy preference prior to leasing for either (a) clustered lease pattern or (b) dispersed lease pattern.	(+) Ensures Secretary that possibility for strategic arrangements of tracts will be studied. (+) Ensures Secretary regional and local "carrying capacity" will be studied. (-) Does not allow for dynamic approach and reduces state and local input. (-) Concerns mentioned in the two "pros" above can be met in ranking process and, therefore, flexibility is surrendered without gain.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process," July 18, 1978. Decision: Option 2; July 28, 1978.
2. Leave decision to local land managers, requiring only that social impacts be one of the factors considered in ranking tracts and that local land managers consider interdependence of tracts on ranking.	(+) Maximum flexibility for local land managers. (+) Maintains integrity of ranking system design and of leasing process. (-) Moves this decision from programmatic EIS to regional EIS, lowering visibility.	
Should assured access to Federal lease tracts be obtained prior to sale?		
1. Lease only those tracts with known assured access.	(+) Avoids manpower and dollar costs of new access program. (+) Fosters competition. (+) Confines access to existing corridors or corridors government has strong control over. (-) May be seen as unfair to companies interested in areas that would not qualify and to consenting surface owners. (-) Eliminates an unknown number of tracts.	Paper: "Intraregional Matters Affecting Design of a Coal Leasing Process," July 18, 1978. Decision: Option 3; July 28, 1978.
2. Adopt full-scale access acquisition program.	(+) Likely to increase the number of bidders and level of bids on certain tracts. (+) Would allow better job of planning for environmental impacts of access. (-) Would involve new program and new costs. (-) Benefits of guaranteed access are not clear yet. (-) Could add time to leasing schedule and lower number of available tracts.	
3. Status quo (access responsibility of winning bidder).	(+) No additional manpower or costs. (+) No risks of untried new program. (-) May lower competition on certain tracts. (-) May risk post-sale failure to mine where access blocked.	
4. Offer assured access on an experimental basis.	(+) Department could ascertain benefits of program without committing manpower and costs. (-) Adds to complexity of program management.	
5. Attempt to "acquire" access together with surface owner consent, otherwise proceed as for Option 1.	(+) Gives lessees assurance of access. (+) Would integrate with split-estate program, taking advantage of conceptual similarities. (-) BLM may not be party selected to directly acquire surface owner consents. (-) Adds complexity to very delicate split-estate program.	

TABLE 3- 2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
What approach should the Department adopt for an ongoing environmental analysis strategy?		
1. Prepare a national coal sale EIS covering all proposed sales to occur in a specified period of time in all production regions. The one EIS would cover all potential site-specific, regional, interregional, and national impacts.	(+) No update of programmatic needed. (+) All possible levels of impact in one document. (-) Administratively complex. (-) Dilutes capability to make specific comments. (-) If statement challenged entire program may be delayed.	Paper: "Environmental Analysis Strategy," August 31, 1978. Decision: Option 2; September 15, 1978.
2. A regional, site-specific EIS would be prepared on a four year schedule of lease sales in each region delineated in the programmatic EIS. Each regional EIS would include analysis of both the site-specific and intraregional cumulative impacts of the proposed leasing actions. Lease sales schedule would be reconsidered two years later when the next biennial process of establishing new regional production targets is completed. If, in any region, substantial differences are found in tract ranking (because of the preparation of additional land use plans or the updating of existing plans or because of changes in environmental, social, or economic conditions) or the relevant new regional production target which requires a change in the tracts proposed for sale, a supplement to the regional statement would be prepared. National and interregional impacts of the Federal coal management program would be analyzed in the programmatic EIS. The document would be updated when conditions change sufficiently to require new analysis of those impacts. (Suboption: Include all pending mining plan approval actions in regional statement.)	(+) Better compatibility with existing BLM organization. (+) Takes maximum advantage of existing analysis in programmatic. (+) Regional schedules could be adopted to regional situations. (-) Several statements would have to be prepared instead of one. (-) Possible controversy over when a programmatic update is needed.	
Should the Secretary condition his decision to proceed with leasing based on existence of split estate (surface/minerals under different ownership) in lease area?		
1. Do not lease where "surface owner" restrictions of Section 714 of SMCRA apply.	(+) Avoids adverse social impact. (+) Implementation easy. (0) Shifts location of environmental damage away from Northern Great Plains. (-) By restricting supply of coal may raise cost to consumer.	Paper: "Coal Leasing: Surface Owner Consent," June 23, 1978. Decision: Option 4; June 30, 1978
2. Same as Option 1, but encourage coal companies to purchase split estates.	(Same as Option 1, moderated somewhat) (-) Outright purchase costs may raise price of coal. (-) Dislocates surface owner permanently.	Modified by: Paper: "Split Estate Leasing Implementation," August 31, 1978. Decision: Option 4; September 15, 1978.
3. Attempt to lease all coal regardless of ownership but decline to lease where compensation payments exceed a standard amount.	(+) Minimizes cost to consumer. (-) Difficult implementation. (-) Subject to legal challenges.	
4. Attempt to lease all coal regardless of surface ownership with passive compensation safeguards through fair market value computation.	(+) Tend to minimize cost to consumer. (+) Implementation straightforward. (+) Should not inhibit development of split estate coal significantly. (-) Fair market value not easily determined.	(Subject to Solicitor's review.) (Suboption considered would have reduced cost allowed for split estates compensation in fair market value computation to zero.)
5. Lease all coal regardless of surface ownership and compensation.	(+) Minimal cost for implementation. (-) Possibly raises cost to consumer. (-) Loss of government income.	
Who should acquire surface owner consents and when?		
1. Industry would acquire consent or options during the development of their expressions of interest and file them with these expressions. Options would be transferable. Terms of the consent options would have to be presented to the Department with the expressions of interest in an area.	(+) Direct government involvement not required. (+) Leasing can proceed without risk of surface owner consent refusal. (-) High cost burden on industry, not all consents will result in leasing. (-) Surface owner faces possible long period of uncertainty regarding use of his land. (-) Surface owner does not have full information available to assist him in making decision.	Paper: "Split Estate Leasing Implementation," August 31, 1978. Decision: Option 2; September 15, 1978.
2. Industry would have the responsibility in the Federal coal management program of acquiring surface owner consent. Consents would have to be filed with the BLM prior to the sale announcement. The consents would be required to be transferable. If no filing of consent is made on a tract prior to the sale announcement, the tract would be removed from the sale schedule (and, if necessary, another tract substituted for it), unless the BLM determines that the tract should nevertheless be offered for lease sale. Should such a determination be made, the successful bidder on that tract in the sale would be given a period of time after the sale to obtain consent. NOTE: Under Secretary added option to have consent acquired after sale.	(+) Direct Government involvement not required. (+) Gives industry most time to negotiate. (+) Allows industry to judge better degree of risk involved in financing consents because of information developed from tract analysis is available. (-) Government bears risk of going through site-specific analysis without surface owner consent. (-) Puts cost burden on industry.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
3. Industry would acquire consents after lease sale announcement but consents must be filed before the actual sale. Consents would be transferable to a third party and consent payments would be contingent on successful sale. Date of actual sale may be held up pending receipt of indication of consent on tract to be offered.	(+) Direct government involvement not required. (+) Industry will be aware of terms of sale before paying for consent. (-) Short time allowed for negotiation. (-) Continues uncertainty regarding consent for tract to last moment, putting all government at risk. (-) Puts cost burden on industry.	
4. Company would acquire consent after it is successful in lease sale; the consent would have to be filed before lease is executed.	(+) Direct government involvement not required. (+) Avoids question of who should negotiate. (+) Avoids unneeded consents. (+) Surface owner has full information. (+) Minimizes direct administrative expenses. (-) Puts previous expenditures of time and funds in preparing tract in jeopardy. (-) Surface owner in very strong bargaining position. (-) Uncertainty of acquiring consents may reduce competitiveness of sale. (-) Puts cost burden on industry. (-) Government would not know if split-estate tracts would be mined until after costs of sale.	
5. At the time the surface owner is consulted by BLM in the planning process, he or she would be offered the opportunity to agree to a written consent to surface mining or to agree to an option for such a consent. The Department would bind the eventual successful bidder to the terms of the consent, including all payments at the time of lease execution. If consent were not forthcoming the area would be dropped from further consideration until the next round of planning--5 to 10 years later. Alternatively, if consent were not forthcoming, but the surface owner indicated a preference for allowing surface mining, the area would remain in the leasing process and a second opportunity would be given the surface owner by BLM prior to offering the tract for lease sale.	(+) Possible reduction in costs of program. (+) Leasing program could proceed without uncertainty caused by consent power. (-) May be seen as unfair to split estate owners. (-) Makes consultation more complex. (-) Relatively lower chance of successfully getting consent. (-) Government bears cost of consent.	
6. BLM would begin to directly seek surface owner consents at the time of tract ranking and would continue to acquire consents through completion of site-specific analyses. Payment would be by the successful bidder at time of lease execution. Third party consents would be negotiated.	Same as Option 2 except government bears cost of consent acquisition. (+) Government could keep program more in phase with tract ranking process. (-) May require new authority to pay for consent.	
7. BLM would negotiate surface owner consents following completion of site-specific analyses and before tracts are offered for sale.	Same as Option 3 except government bears cost of consent acquisition. (+) Surface owner gets maximum information. (-) BLM would be in difficult negotiating position because of costs sunk in tract analysis and selection.	
<u>What should the Department's policy be toward pre-existing consents?</u>		
1. Offer tracts which are covered by nontransferable consents in intertract sales only.	(+) Meets Secretary's policy regarding transferability of consents. (-) Requires BLM to institute new program.	Paper: "Split Estate Leasing Implementation," August 31, 1978. Decision: Option 3; September 15, 1978.
2. Decline to lease tracts with pre-existing consents that are not transferable.	(+) Minimizes administrative cost of pre-existing consent process. (-) Subject to possible legal challenge.	
3. (Combination of 1 and 2) Tracts which are selected for lease sale and which include areas covered by pre-existing consents would be offered for sale if the consents are determined to be transferable. If any pre-existing consent is determined to be nontransferable the tract would not be offered for sale unless it is included in an intertract sale.	(+) Processes greatest number of consents. (-) Greatest administrative burden.	
<u>Should the Department require compensation be paid to companies for consents they acquire?</u>		
1. A surface owner consent agreement would be considered transferable only if it provides that (1) the payment for the consent is to be made by the successful bidder after the lease sale in which the lease for the tract to which the consent applies is sold or (2) after the lease sale, the successful bidder is permitted to reimburse the company which first obtained the consent for the purchase price of the consent.	(+) Low administrative costs. (+) Encourages companies to acquire consents by ensuring they would not be bound to pay cost of consent on the tracts they do not obtain. (-) Complicates negotiations between coal companies and surface owners.	Paper: "Split Estate Leasing Implementation," August 31, 1978. Decision: Option 1; September 15, 1978.
2. Foster the sharing of risk of losing consent costs by encouraging the development of industrial groups for the purpose of acquiring consent options.	(+) Reasonably low administrative costs. (-) May be seen as anti-competitive by encouraging grouping of would-be lessees in future sales.	
3. Take the position that loss of consent costs is a normal business risk in which the government should not be involved.	(+) No administrative costs. (-) Would discourage industry from acquiring consent unless they had competitive edge. (-) One company might end up paying for another's consent acquisition.	

TABLE 3-2
(Continued)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
Where will the unsuitability criteria be applied? How will the unsuitability criteria be applied? (NOTE: Paper presented application procedure that appears in Section 3.1 of this statement.) 1. Accept 2. Defer 3. Reject 4. Modify	No pro/con analysis developed.	Paper: "Land Unsuitability Criteria," September 22, 1978. Decision: Option 1; October 3, 1978.
What specific criteria should the Secretary adopt? Criteria in the following areas were considered: 1. Federal land systems. 2. Right-of-way and easements. 3. Buffer zones along rights-of-way and adjacent to communities and buildings. 4. Wilderness study areas. 5. Scenic areas. 6. Land used for scientific study. 7. Historic lands and sites. 8. Natural areas. 9. Federally-listed endangered species. 10. State listed endangered species. 11. Bald and golden eagle nests. 12. Bald and golden eagle roost and concentration areas. 13. Falcon cliff nesting sites. 14. Migratory birds. 15. State resident fish and wildlife. 16. Wetlands. 17. Floodplains. 18. Municipal watersheds. 19. National resources. 20. Alluvial valley floors. 21. Prime farm lands. 22. Reclaimability. 23. State lands unsuitable. 24. State-proposed criteria. 25. Rare vegetation.	No pro/con analysis developed. (Development and analysis of the criteria are described in the final report of Task Force 2 available from the Department.)	Paper: "Land Unsuitability Criteria," September 22, 1978. Decision: Accept 19 criteria; October 3, 1978. Reject criterion on rare vegetation (25), defer state lands unsuitable and state-proposed criteria, and accept all others. Additionally, Assistant Secretary Energy and Minerals was asked to recommend criteria for alluvial valley floors, reclaimability, and prime farm lands. Paper: "Proposed Additional Unsuitability Criteria," October 30, 1978. Decision: Accept Criteria 20 through 24; November 2, 1978. (Accepted criteria are set forth in Table 3-7.)

TABLE 3-2

(Concluded)

POLICY OPTIONS - SECRETARY'S PREFERENCE

ISSUES AND OPTIONS	PROS AND CONS	PAPER AND DATE/COMMENTS
Should the Department establish Federal/State teams to review all tract delineation and site specific analysis work and be responsible for the tract ranking, selection, and scheduling processes and to serve as the forum for federal - State discussions?		
1. Concur 2. Do not concur. 3. Concur, but with changes. 4. Defer.	(+) Enhances major program goal of federal-state coordination (+) Allows state governors less formal input to program than the required consultation process. (+) Would provide citizens of state with authoritative forum for airing interests. (-) Possibly confuses where decision authority resides in Department	Paper: "State Participation in Activity Planning", February 27, 1979. Decision: Option 1; March 2, 1979
Should the exception allowing continuation of tracts past sales notice without prior evidence of written surface owner consent be deleted?		
1. Delete the exception. 2. Retain the exception. 3. Modify the exception. 4. Defer.	(+) Exception is valid under law. (+) Good public policy from efficient land use management standpoint. (-) Perceived by many commenters as potentially placing undue pressure on surface owners. (-) May have appearance of putting BLM and coal company in tandem against surface owner. (-) Arguably violates "spirit" of Section 714.	Paper: "Surface Owner Consent Procedures", February 27, 1979. Decision: Option 1; March 2, 1979
Should the Department adopt the following policy? If, after publication of a land use plan, a surface owner on land acceptable for further consideration for coal leasing submits a statement that he has not previously given consent to mine and will not give such consent in the foreseeable future, the Federal coal underlying that surface would not be considered further in the ongoing activity planning process or any such processes conducted in the future until the land use plan is revised or until the ownership of the surface estate changes.		
1. Concur. 2. Reject. 3. Modify. 4. Defer.	(+) Allows a surface owner to give a definite no, a feature not previously in the process. (+) Surface owner would not be forced to continue to submit to exploration and other tract preparation work and would not continue to receive consent purchase overtures even if he firmly does not want to consent. (+) Advances "spirit" of Sec. 714. (+) Makes the activity planning processes more efficient. (-) Converts consent pressure to sales pressure for the surface owner.	Paper: "Surface Owner Consent Procedures", February 27, 1979. Decision: Option 1; March 2, 1979
Should the discretion granted the local land manager to continue an area in the process if a firm preference against leasing is expressed during consultation be dropped and the exclusion of such lands from further consideration be made mandatory? The owner would have to indicate on the consultation form that he has not given an earlier consent and will not consent for the life of the plan.		
1. Agree. 2. Agree as modified. 3. Disapprove. 4. Defer.	(+) Answer argument advanced by many commentors that discretion at this point was not intended. (+) Extends the coverage of the "definite no" process set out in issue above. (-) Confuses consultation and consent processes. (-) Presents possibility of having to process plan amendments when ownership changes. (-) Introduces rigidity into process by going from a policy preference to firm direction to local land manager.	Paper: "Surface Owner Consent Procedures", February 27, 1979. Decision: Option 4 (but publish in preliminary rulemaking and request comments); March 2, 1979.

initiative and the forums for making decisions in the Federal coal management program. This emphasis on planning is fully consistent with statutory requirements. Section 3(A)(i) of the Federal Coal Leasing Amendments Act of 1976, amending Section 2 of the Mineral Leasing Act of 1920, directs that "no lease sale shall be held unless the lands containing the coal deposits have been included in a comprehensive land-use plan and such sale is compatible with such plan." The Federal Land Policy and Management Act of 1976 established the basic planning authority for the Bureau of Land Management (BLM) and the Multiple-Use Sustained-Yield Act of 1960 and the National Forest Management Act of 1976 provided planning guidance for the Forest Service. The guidelines for planning in the Federal Land Policy and Management Act include:

- Inventory public lands, their resources, and other values.
- Apply an interdisciplinary approach.
- Give priority to the designation and protection of areas of critical environmental concern.
- Consider present and potential uses of the land.
- Consider the relative scarcity of the values involved and alternative means and sites for realization of those values.
- Consider both long-term and short-term benefits.
- Provide for compliance with applicable pollution control laws.
- Coordinate inventory, planning, and management with other Federal agencies and state and local governments.

The products of both the Bureau of Land Mangement's and Forest Service's land use planning processes are comprehensive, multiple-use land use plans for discrete areas of Federal lands. These plans are now called Management Framework Plans (MFPs) by the Bureau and Unit Plans by the Forest Service. The planning systems of the two land management agencies are broadly similar and are expected to be even more closely related when new planning regulations under the Federal Land Policy and Management Act of 1976 and the National Forest Management Act of 1976 are promulgated.

The Forest Service's proposed National Forest System Land and Resource Management Planning Rules were published on August 31, 1978 (43 Federal Register 39046-39059). The BLM's proposed planning regulations were published on December 15, 1978 (43 Federal Register 58764-58774). Under the proposed regulations, the unit plans of the Forest Service would be renamed National Forest Plans and the Management Framework Plans of the BLM would be termed Resource Management Plans.

Both sets of proposed regulations would permit the continued use of existing plans as bases for resource development decisions until new plans are developed under the new procedures. Therefore, both existing plans under present procedures and new plans under changed procedures may be used in future coal management decisions. However, as a matter of practice and program policy, the Department of the Interior will give considerable priority to preparation of new Resource Management Plans in the most critical high value coal areas. Some Resource Management Plans may be finished as soon as late 1984. In the meantime, existing Management Framework Plans would be examined closely and modified as necessary to ensure compliance with the proposed unsuitability criteria and surface owner consultation procedures (see Sections 3.2.2.2 and 3.2.2.4). The results of this examination and modification would be published in supplements to the Management Framework Plans.

The BLM planning system, under the proposed regulations, will call for the completetion of nine required steps. These are the same steps prescribed in the proposed Forest Service planning system. This should enhance common understanding of these processes. There will be substantial differences in how these steps are accomplished and documented, both between the BLM and Forest Service and from plan to plan within each agency, based on variations in issues, concerns, data, and legal authorities.

The required steps in each agency's proposed new land use planning system are listed in the left-hand column below, in the general sequence they are to be initiated. The existing BLM planning system components are listed in the right-hand column below to indicate which components of the existing system include the same general objectives and scope as the steps in the proposed system. The new steps are designed to improve substantially the quality of land use plans and are explained in

detail in the proposed planning regulations. (The existing BLM system procedure was described in more detail in the draft version of this statement.)

Steps in the New BLM Planning System Presented In the Proposed Regulations	Existing BLM Planning System Components Including the Same General Objectives and Scope as the Steps In the Proposed Regulations.
1. Identification of issues, concerns, and opportunities.	Portions of the Planning Area Analysis
2. Development of planning criteria.	Portions of the Preplanning Analysis.
3. Inventory data and information collection	No comparable requirement, since existing system uses available information.
4. Analysis of the management situation.	Portions of Unit Resource Analysis, Planning Area Analysis, and first step of the Management Framework Plan.
5. Formulation of Alternative Plans.	Management Framework Plan Step Two.
6. Estimation of the effects of alternatives.	Management Framework Plan Step Two.
7. Selection of Preferred Alternative and filing the draft EIS.	MFP Step Two (no requirement in existing system for preparation of an EIS).
8. Selection of preferred plan and filing the final EIS.	MFP Step Three (no requirement in existing system for preparation of an EIS).
9. Monitoring and evaluation of plan.	No similiar requirement in existing system.

The manner in which the Forest Service's planning process will relate and contribute to the coal management program will be set forth in Memoranda of Understanding now being negotiated by the Forest Service and the BLM. The first of these is to be on unsuitability criteria. (As the Secretary is required by section 522 of the Surface Mining Control and Reclamation Act to make the determination of which land is unsuitable for surface coal mining on all Federal lands, in order for the Forest Service to conduct the application of unsuitablity criteria on national forest system lands, the Secretary must delegate the authority to do so to that agency.) It is expected that the Forest Service will adopt the unsuitability criteria which the Secretary selects when he makes his program decisions except where modifications are necessary to reflect the Forest Service's missions and programs and the Secretary approves such modifications. The land use plans which are the products of both the existing and proposed land use planning systems identify preferred land uses, or combinations of uses, for the planning areas and serve as guides to the Federal land managers. The land use plans establish the nature, extent, and objectives for future actions and programs on lands administered by the two agencies. Under the Secretary's preferred alternative, the principal coal resource decision in the land use plans would be the determination of which areas are acceptable for further consideration for coal leasing (see Figure 3-2). These areas would be identified after placing all lands in a planning area through four screens, integral to the planning process:

1. Areas would be eliminated from any further coal development consideration if they do not have high to medium coal potential (see Section 3.2.2.1).
2. Additional coal areas would be eliminated if they are judged unsuitable under the Department's unsuitability criteria (see Section 3.2.2.2).
3. Additional coal areas may be eliminated on multiple use grounds if other Federal resource values are determined to be superior to coal (see Section 3.2.2.3).
4. Additional coal areas where the Federal government owns the coal, the coal would be surface mined, and the surface is owned by ranchers or farmers may be eliminated after consultation with those surface owners (see Section 3.2.2.4).

The remaining areas after application of these screens would be identified in the land use plan as areas acceptable for further consideration for coal leasing, subject to areawide constraints and multiple use coordination requirements to guide coal program activities. (Note: Any leasing which is conducted would not involve all the land in these areas. Those lands not leased would, of course, continue to be available for any other uses, (e.g., livestock grazing) permitted by the land use plan.) These constraints and requirements could include such actions as: (a) establishment of threshold

development levels over the planning area (see Section 3.2.2.5); (b) identification of unique stipulations to be placed in any potential coal lease on an area which the land use plan might identify as acceptable for further consideration for leasing; and (c) recommendations of preferred coal leasing areas if the areas acceptable for further consideration for coal leasing clearly are larger than may be needed for leasing (see Section 3.2.2.6). The proposed planning regulations would require review of a plan every five years, and full revision of a plan in 15 years, or earlier if necessary.

All potential resource users — ranchers, coal companies, timber purchasers, environmental organizations, etc. — should participate actively in the land use planning process if the process is to allocate uses of the Federal lands in the best possible manner. For example, the coal industry would be expected to help identify high and medium potential coal resources and no area would be excluded in the first screen that is shown by a company to contain coal which possesses a medium or high potential for development. Industry would also be expected to argue forcefully in favor of coal development over other uses in the resources trade-off screen and provide any data it might have which would permit the making of exceptions to the application of unsuitability criteria. Environmental organizations would be expected to assist the planning team in identifying situations which require the application of unsuitability criteria, critique information which suggests exceptions may be made, and advocate non-commodity uses of the land. Ranchers, timber purchasers, and other users should voice their desire to see sufficient land allocated to their respective uses, provide the planning team with information as to their needs, and argue forcefully for the allocation to their uses of specific areas for which other users are competing in the resources trade-off screen. Throughout the land use planning process, opportunities are provided for this type of participation and public participation is given special emphasis in the proposed new planning regulations of the Bureau of Land Management (43 Federal Register 58764–58774) and the Forest Service (43 Federal Register 39046–39059).

3.2.2.1 Coal Potential. Only a portion of the coal resources within a land use planning area is likely to be potentially economic to mine or to become so over the life of the land use plan. Rather than apply all the screens in the land use planning process to uneconomic coal, the first screen to be applied would identify high or moderate development potential coal. Lands with less than moderate development potential would be dropped from further consideration until their potential for development is judged to be higher, perhaps the next land use planning cycle.

The major source of information for this screening would be the coal resource occurrence/coal development potential (CRO/CDP) maps and other related coal potential analysis of the U.S. Geological Survey. Where CRO/CDP maps are not available, other sources of information such as information from the Geologic Survey of the states and other available U.S. Geological Survey data would be used. It should be emphasized that this screen is only the first of four in the land use planning process and its application does not have as its result the designation of any land as an area to be included in a lease sale (a decision taken only later in activity planning after land use planning has been completed) or even to be determined acceptable for further consideration for possible leasing (a decision to be made at the end of land use planning after all four screens have been applied). With this in mind, coal companies, the states, or members of the public may submit non-confidential coal geological and economic data during the earlier inventory phase of planning. Where such information is determined to indicate significant development potential for an area not shown to be of medium or high potential in the CRO/CDP maps, the area would not be excluded from further consideration and application of the remaining screens in the land use planning process.

3.2.2.2 Unsuitability Criteria. The key activity added to the land use planning process as a result of the requirements of Section 522 of SMCRA and other policy directives is the application of lands unsuitability criteria. It is the second of four screens applied to Federal coal lands in the land use planning process.

The President, in a May 24, 1977 memorandum implementing his Environmental Message of May 23, 1977, instructed the Secretary of the Interior to lease "only those areas where mining is environmentally acceptable and compatible with

other land uses." The President further directed that the Department "scrutinize existing Federal coal leases (and preference right lease applications) to determine whether they show prospects for timely development in an environmentally acceptable manner, taking steps as necessary to deal with nonproducing and environmentally unsatisfactory leases and applications."

In addition, on August 3, 1977, the President signed into law the Surface Mining Control and Reclamation Act (SMCRA). Section 522 of this Act requires the Secretary to review Federal lands to determine whether they contain areas which are unsuitable for surface coal mining operations. SMCRA also contains a requirement for the states to undertake a similar program for non-Federal lands if they wish to assume primary regulatory authority under the Act. A list of standards to be used by the states is identified in Section 522(a)(3) of the Act. These same standards are also required to be applied to Federal lands (private surface lands overlying Federal coal are considered to be Federal lands for the purposes of the application of the standards).

Under the preferred program, unsuitability criteria have been developed in response to Section 522 of SMCRA and the directives in the President's Environmental Message. The criteria are to be applied to medium and high potential coal lands in the land use planning process to identify those areas with key features, principally environmental, which make them unsuitable for all or certain methods of coal mining and thus should not be leased for that purpose. Accordingly, these areas would be removed from the activity planning process of delineation, ranking, selection and scheduling of tracts for lease sales or continued for only certain stipulated methods of mining. A principal purpose of the unsuitability criteria is to ensure that the responsibility of determining Federal lands unsuitable for coal mining is fulfilled in as consistent, uniform, and objective a manner as possible so that all parties—public officials, coal companies, environmentalists, and the public—can have confidence in the unsuitability decisions. As Federal land planners have not had to follow any such national standards before, their very existence would fulfill the purpose of limiting the incidence of divergent, subjective land use decisions. Certainly, because of the vast differences in topography and other conditions in Federal coal lands, no set of criteria can be designed to eliminate entirely the necessity, or indeed the advisability, of subjective, site-specific decisions by the planners. However, the proposal to include the procedures for applying the criteria and the criteria themselves in regulations (see Appendix A), and the proposed application procedures which emphasize public accountability for application decisions and limit the situations in which exceptions to criteria are to be considered, would greatly reduce the range and number of subjective judgments the planners might otherwise make lacking firm policy guidance.

Section 522 does not require that the Federal lands unsuitability review be completed prior to leasing or even prior to issuance of a mining permit, although several individual criteria selected by the Under Secretary incorporate mandatory requirements of section 522 of SMCRA and other statutes and would have to be applied prior to permit issuance. However, the Department has proposed to apply all the criteria at the mining plan stage. In addition, the Secretary chose to apply the criteria not just at the mine plan stage late in the coal management decision making process but also at the beginning of the process in land use planning. He expressed this preference for several reasons: to provide greater predictability for all interested parties in the coal management program, to ensure that lands which clearly should not be mined are excluded from leasing consideration as promptly as possible, and to avoid the costly situation for both a coal company and the Federal government of taking a tract all the way through lease sale and mine plan development only to find it is either unminable or would require such restrictive stipulations in the mine plan or mining permit as to make mining uneconomic.

An intensive Department-wide effort was made to develop the 24 unsuitability criteria and their exceptions selected by the Under Secretary for inclusion in the preferred program and set forth in Table 3-3. Between November 1977 and March 1978, a task force representing ten agencies and offices in the Department of the Interior and the Forest Service, Department of Agriculture, conducted a comprehensive review of existing legislation, Presidential and Secretarial Orders, and Departmental policy and prepared a set of draft unsuitability criteria with, in many cases, alternative criteria and exceptions. These criteria (set

TABLE 3-3

PROPOSED CRITERIA FOR ASSESSING
AND DESIGNATING FEDERAL LANDS UNSUITABLE FOR
ALL OR CERTAIN TYPES OF COAL MINING OPERATIONS*

	CRITERION	EXCEPTIONS & EXEMPTIONS
(a) Federal Land Systems	All Federal lands included in the following land systems or categories and an appropriate buffer zone, if necessary, as determined by the land management agency, shall be considered unsuitable for coal mining: National Park System, National Wildlife Refuge System, National Systems of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, Custer National Forest, and Federal lands in incorporated cities, towns, and villages. All Federal lands which are recommended for inclusion in any of the above systems or categories by the Administration in legislative proposals submitted to the Congress or which are required by statute to be studied for inclusion in such systems or categories shall be considered unsuitable.	Exception: A lease may be issued and mining operations may be approved within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted. Exemptions: The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights. The application of the buffer zone portion of this criterion does not apply to lands: to which substantial financial and legal commitments were made prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.
(b) Rights-of-Way and Easements	Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, or for agricultural crop production on Federally owned surface shall be considered unsuitable.	Exceptions: A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that: (i) all or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or (ii) the right-of-way or easement was granted for mining purposes; or (iii) the right-of-way or easement was issued for a purpose for which it is not being used; or (iv) the parties involved in the right-of-way or easement agree to leasing; or (v) it is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations. Exemption: This criterion does not apply to lands on which mining would result in substantial loss or reduction of long-range productivity of food or fiber products, and it does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

*See Table 5-88 for the draft unsuitability criteria field-tested in the summer of 1978.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXEMPTIONS
(c) Buffer Zones Along Rights-of-Way and Adjacent to Communities and Buildings	Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public highway or within 100 feet of a cemetery, or within 300 feet of an occupied public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.	Exceptions: A lease may be issued and mining operations approved for lands: (i) used as mine access roads or haulage roads that joing the right-of-way for a public road; (ii) for which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated; (iii) for which owners of occupied buildings have given permission to mine within 300 feet of their buildings. Exemption: The application of this criterion is subject to valid existing rights.
(d) Wilderness Study Areas	Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan must consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved if authorized by the Federal Land Policy and Management Act of 1976. Exemption: The application of this criterion to lands for which the Bureau of Land Management is the surface management agency is subject to valid existing rights.
(e) Scenic Areas	Scenic Federal lands designated by visual resource management analysis as Class I or II (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved if the surface management agency determines that mining operations will not significantly diminish or adversely affect the scenic quality of the designated area. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXEMPTIONS
(f) Lands Used for Scientific Studies	Federal lands under permit by the land management agency for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable.	Exceptions: A lease may be issued and mining operations approved: (i) with the concurrence of the principal scientific user or agency; or (ii) where it would be stipulated that the mining would be done in such a way as not to jeopardize the purpose of the study as determined by the surface management agency. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.
(g) Historic Lands and Sites	All districts, sites, buildings, structures, and objects of historic, architectural, archaeological, or cultural significance which are included in or eligible for inclusion in the National Register of Historic Sites, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that make it eligible for listing in the National Register) as determined by the land management agency, in consultation with the Advisory Council on Historic Preservation or by procedures approved by the Advisory Council, shall be considered unsuitable.	Exceptions: A lease may be issued and mining operations approved if the surface management agency determines: (i) with the concurrence of the state, that the site, structure, or object is of regional or local significance only; or (ii) in consultation with the Advisory Council on Historic Preservation, that the direct and indirect effects of all or certain stipulated methods of coal mining on a property in or eligible for the National Register of Historic Sites will not result in significant adverse impacts to the site, structure, or object. Exemption: The application of this criterion is subject to valid existing rights.
(h) Natural Areas	Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.	Exceptions: A lease may be issued and mining operations approved in an area or site if the surface management agency determines that: (i) with the concurrence of the state, the area or site is of regional or local significance only; (ii) the use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or (iii) the mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites). Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXEMPTIONS
(i) Federally Listed Endangered Species	Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the surface management agency determines the species and its habitat will not be adversely affected by all or certain stipulated methods of coal mining operations.
(j) State Listed Endangered Species	Lands containing habitat deemed critical or essential for plant or animal species listed by state pursuant to state law as endangered or threatened shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.
(k) Bald and Golden Eagle Nests	A bald or golden eagle nest that is determined to be active and a buffer zone of land in a 1/4 mile radius from a nest area which shall be considered unsuitable. Consideration of availability of habitat for prey species shall be included in the determination of buffer zones.	Exceptions: (i) A lease may be issued and mining operations approved if: (A) they can be conditioned in such a way, either in manner of period of operation, that eagles will not be disturbed during breeding season; or (B) golden eagle nest sites will be moved with the concurrence of the Fish and Wildlife Service. (ii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXEMPTIONS
(l) Bald and Golden Eagle Roost and Concentration Areas	Bald and golden eagle roost and concentration areas used during migration and wintering shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.
(m) Falcon Cliff Nesting Sites	Federal lands containing falcon cliff nesting sites with active nests and a buffer zone of Federal land in a 1/4 mile radius from the nest to provide needed prey habitat shall be considered unsuitable. Consideration of availability of habitat for prey species shall be included in the determination of buffer zones.	Exception: A lease may be issued and mining operations approved where the land management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.
(n) Migratory Birds	Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.
(o) State Resident Fish and Wildlife	Federal lands which the land management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Such lands may include appropriate buffer zones as determined jointly by the surface management agency and the state. Such lands shall include: (i) active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken; (ii) the most critical winter ranges for deer, antelope, and elk; and (iii) migration corridors for elk.	Exceptions: A lease may be issued and mining operations approved if the surface management agency, in consultation with the state wildlife agency, determines that: (i) complete mitigation is possible; or (ii) the species being protected will not be adversely affected by all or certain stipulated methods of coal mining. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXEMPTIONS
(p) Wetlands	Federal lands containing: (i) inland lakes, impoundments, and associated wetlands; (ii) inland shallow, predominantly vegetated wetlands; or (iii) riverine wetland systems, lower and upper perennial systems with flow greater than 5 cubic feet per second, and riparian zones in a "relatively undisturbed" state that are larger than one linear mile along a riverine system shall be considered unsuitable.	Exceptions: A lease may be issued and mining operations approved where the surface management agency determines that: (i) the use of appropriate stipulated mining or reclamation technology will not significantly affect the wetlands or will provide for complete restoration; or (ii) the welands contain no significant values for groundwater recharge, fish and wildlife habitat, recreation, or scientific study. Exemption: This criterion does not apply to lands to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.
(q) Floodplains	Riverine, coastal, and special floodplains (100-year recurrence interval) shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved where the surface management agency determines that: (i) leasing a particular tract and approval of mining operations is the only practicable method of access to coal lands outside the floodplain which are not unsuitable under any other criterion; and (ii) potential for harm to people or property and natural and beneficial values of floodplains can be minimized through stipulated use of demonstrated and available mining and mitigation measures. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

TABLE 3-3 (continued)

	CRITERION	EXCEPTIONS & EXCLUSIONS
(r) Municipal Watersheds	Federal lands which have been committed by the land management agency to use as municipal watersheds shall be considered unsuitable.	Exception: A lease may be issued and mining operations approved where: (i) the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree; and (ii) the municipality or water users concur in the issuance of the lease. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.
(s) National Resource Waters	Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands 1/4 mile from the outer edge of the far banks of the water, shall be unsuitable.	Exception: The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.
(t) Prime Farm Lands	When the surface management agency, with the concurrence of the Secretary of Agriculture (Soil Conservation Service), identifies Federal lands having prime farmland soils, such lands shall be considered unsuitable.	Exceptions: A lease may be issued when: (i) conditions such as soil rockiness, angle of slope or historic or other conditions leading to a negative determination under the permanent regulations of the Office of Surface Mining Reclamation and Enforcement are present; or (ii) scientific studies show that crop yields equivalent to premining crop yields on nonmined prime farmlands in the surrounding area under equivalent levels of management could be obtained and that an operator or potential operator could meet the soil reconstruction standards in section 515(b)(7) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1265 (b)(7)), and the permanent regulations of the Office of Surface Mining Reclamation and Enforcement.

(u) Alluvial Valley Floors	Federal lands identified by the surface management agency, with the concurrence of the State in which they are located, as alluvial valley floors according to the definition and standards in the permanent regulations under the Surface Mining Control and Reclamation Act of 1977, and the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.	Exception: A lease may be issued where all or certain methods of coal mining would not interrupt, discontinue, or preclude farming on land to which the first sentence of the criterion applies.
(v) Reclaimability	As information regarding reclaimability on a local or regional basis becomes available, the surface management agency shall use such information to determine if areas of Federal land are reclaimable to the standards of the Surface Mining Control and Reclamation Act of 1977, the regulations, and approved state programs. Examples of information on reclaimability would be soil studies, hydrologic studies, and studies concerning revegetation. If any area is determined not to be so reclaimable, such area shall be considered unsuitable.	Exception: A lease may be issued upon presentation of information which contains results of studies showing that reclamation is possible to the standards in the permanent regulations of the Office of Surface Mining Reclamation and Enforcement, and an approved state program, including state regulations.
(w) State Lands Unsuitable	Federal lands in a state to which is applicable a criterion (i) proposed by the state, and (ii) adopted by rulemaking by the Secretary of the Interior, shall be considered unsuitable for coal mining.	Exceptions: A lease may be issued when: (i) such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft land use plan, or supplement to a land use plan, for the area in which such land is included, or (ii) the surface management agency, in consultation with the state, determines that, although the criterion applies, mining will not adversely affect the value which the criterion would protect. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

TABLE 3-3 (concluded)

(x)	State Proposed Criteria	A buffer zone of Federal lands necessary to provide protection for any adjacent area designated as land unsuitable for mining by the state shall be considered unsuitable.	Exception: The buffer zone may be modified or eliminated where the surface management agency, in consultation with the state, determines that all or parts of the zone are not necessary to protect the designated area. Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

forth in Table 5-88) were then field tested by three task force teams on Federal lands in four test areas in Montana, Utah, and Wyoming during the summer of 1978. After completion of the field tests, the task force reconvened to review the field test results and, on the basis of those results, to recommend to the Department which criteria and exceptions should be altered, added, or deleted. The field test results and recommended criteria and exceptions appear in the task force's September 12, 1978, final report, Land Unsuitability Criteria (available upon request from the Department) [2]. The Under Secretary expressed a preference for the twenty-four criteria and their exceptions set forth in Table 3-3 after extensive discussions in the manner described in Section 3.2.1. with the Assistant Secretaries for Land and Water Resources; Fish, Wildlife and Parks; Energy and Minerals; and Policy, Budget and Administration; and the Solicitor. Each Assistant Secretary and the Solicitor proposed new language for many of the task force's recommended criteria and exceptions and either deletions or additions to those criteria and exceptions. Certain criteria and exceptions were more tightly drawn to ensure that their application would not result in the screening out of lands not necessary for the protection of the values reflected in the criteria. On the other hand, a number of new criteria were added by the Under Secretary to provide protection to values other than those which the task force's recommended criteria were intended to protect. Finally, one criterion recommended by the task force was deleted by the Under Secretary. (See Section 5.4.8 and Table 5-89 for a discussion of field test results and changes made in the draft field test criteria (Table 5-88) before their adoption as the proposed criteria for the preferred program (Table 3-3).)

Because the criteria and exceptions selected by the Under Secretary for the preferred program are changed significantly from the criteria and exceptions originally field tested by the task force, the Department determined that they should be field tested anew before any final decision on them is made by the Secretary. Furthermore, the Department designed procedures for these field tests to ensure that the criteria and exceptions would receive attention not only from the land management agencies' planners, but also from interested user groups and the public. The field tests are being conducted in a four-county area in Alabama and on 540,000 acres in nine planning units in Colorado, Montana, Utah, and Wyoming. The preliminary results have been made available to the public in the form of draft supplements to existing land use plans and public meetings have been held on the documents. The draft supplements and public comments on them will be fully considered by the Secretary prior to making any final decision on a Federal coal management program. Any changes in the preferred criteria and exceptions adopted by the Secretary would be subsequently incorporated in the final supplements which would be published after the Secretary's decision. (The procedures for conducting the field tests and preparing the supplements were published on December 8, 1978, in 43 Federal Register 57662–57670.)

These 24 preferred unsuitability criteria can be divided into four categories: those which are required under Section 522 of SMCRA (e.g., Federal land system, buffer zones along rights-of-way and adjacent to communities and buildings, and reclaimability criteria), those which are discretionary under Section 522 (e.g., land used for scientific studies, municipal watersheds, and floodplains criteria); those which embody requirements under other statutes which the Department chooses to enforce through the application of unsuitability criteria (e.g., federally-listed endangered species and bald and golden eagle criteria); and those which are not required by statute but which the Department has decided to apply in its discretion as good public policy (e.g., scenic areas, state resident fish and wildlife, state lands unsuitable, and state proposed criteria). In short, some of the criteria involve interpretation of legal requirements within circumscribed limits; others represent an attempt to set broader limits on field-level resource management judgments that have previously been entirely discretionary. (Table 3-4 sets out the authorities for each unsuitability criterion.) Each criterion in all four categories of criteria, including the two discretionary categories, would be fully applied during land use planning; the responsible official would not have the discretion to refrain from applying any criterion. The only remaining discretion, either permitted by law in the required criteria or inherent in the discretionary criteria, is incorporated in the exceptions and the decision whether to apply an exception. The combination of, first, taking issues that have been

TABLE 3-4

PROPOSED UNSUITABILITY STANDARDS:
THEIR SOURCES AHD LIMITATIONS

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
1-1. Lands in federal land preservation systems (National Parks, Wildlife Refuges and Trails	a. 522(e)-SMCRA;	a. mandatory	a. valid existing rights; surface coal mining operations existing on 8-3-77	
	b. 16-FCLAA	b. mandatory	b. none	
1-2. Buffer zones around such land	522(a)(3)-SMCRA Clean Air Act	discretionary	522(a)(6)-SMCRA 2/	
1-3. Lands in Custer National Forest [3461.2(a)]	522(e)-SMCRA	mandatory	valid existing rights; existing surface coal mining operations	operations that involve no surface coal mining operations (522(e)(2)(B) proviso-SMCRA)

1/ Statutory sections are cited if clear. SMCRA means the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. § 1201 et seq.; FCLAA means the Federal Coal Leasing Amendments Act of 1976; FLPMA means the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701, et seq.

Section 2 of the Mineral Leasing Act, as amended, 30 U.S.C. § 201, contains the Secretary's ultimate discretion to lease or not to lease in the public interest. It applies to all the criteria. Similarly, sections 201 and 202 of FLPMA, the Secretary's resource inventory and land use planning authorities, apply to all criteria on all lands administered by the Bureau of Land Management. These sections are cited only when they are relied on as authority for the criterion.

2/ In every case, section 522(a)(6) exempts: (a) operations approved under SMCRA; (b) surface coal mining operations existing on August 3, 1977; and (c) operations to which substantial legal and financial commitments were made prior to January 4, 1977.

3/ The general authority for the exception is found in the coverage or limitations on the coverage of the statutory policies and protections.

TABLE 3-4 (CONTINUED)

	CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
2.	Lands in federal leases, permits or rights-of-way for other purposes [3461.2(b)]	a. 715-SMCRA; b. 522(e)(4)-SMCRA	a. mandatory b. mandatory	b. valid existing rights; surface coal mining operations existing on 8-3-77	discretion when section 715 satisfied by consent or otherwise
3.	Lands within certain distances of cemetaries, public buildings, public roads [3461.2(c)]	a. 522(e)(4) and (5)-SMCRA	a. mandatory	a. valid existing rights; surface coal mining operations existing on 8-3-77	522(e)(4) and (5)-SMCRA
		b. 522(a)(3)(B)	b. discretionary	b. 522(a)(6)-SMCRA 2/	
4.	Lands in wilderness study areas [3461.2(d)]	a. 603(c)-FLPMA;	a. mandatory in most cases	a. operations in manner and degree of existing operations; valid existing rights	a. if nonimpairment of wilderness suitability --603(c)-FLPMA;
		b. 522(a)(3)(B)-SMCRA;	b. discretionary	b. 522(a)(6)-SMCRA 2/	
		c. National Forest Management Act; d. Wilderness Act	c. discretionary		c. Wilderness Act 3/
5.	Class I or II scenic lands [3461.2(e)]	a. 522(a)(3)(B)-SMCRA; b. 201-202-FLPMA	discretionary	a. 522(a)(6)-SMCRA 2/ b. valid existing rights	discretion
6.	Lands used for scientific study (crops, resources, technology) [3461.2(f)]	a. 522(a)(3)(C)-SMCRA; b. 715-SMCRA	a. discretionary b. mandatory	a. 522(a)(6)-SMCRA 2/	discretion when section 715 satisfied by consent or otherwise

TABLE 3-4 (CONTINUED)

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
7-1. Lands containing listed or eligible National Register sites	a. 522(e)(3)-SMCRA;	mandatory	a. valid existing rights; surface mining operations existing on 8-3-77	National Historic Preservation Act 3/
	b. National Historic Preservation Act	discretionary		
7-2. Buffer zones for such lands [3461.2(g)]	522(a)(3)(B)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	
8. Lands in national natural landmarks [3461.2(h)]	522(a)(3)(B)-SMCRA; Antiquities Act	discretionary	522(a)(6)-SMCRA 2/	discretion
9. Lands in designated critical habitat for or documented as habitat for federal threatened or endangered species [3461.2(i)]	Endangered Species Act	mandatory	none	Endangered Species Act 3/
10. Lands in designated critical habitat for state threatened or endangered species [3461.2(j)]	201, 202 and 302(b)-FLPMA	discretionary	valid existing rights	discretion
11. Lands containing bald or golden eagle nest, and buffer zone [3461.2(k)]	a. Eagle Protection Act	a. mandatory	none	Eagle Protection Act 3/
	b. Endangered Species Act	b. mandatory		Endangered Species Act 3/

TABLE 3-4 (CONTINUED)

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
12. Lands containing bald or golden eagle migration or wintering roost, and buffer zone [3461.2(1)]	Eagle Protection Act; Endangered Species Act	mandatory	none	Eagle Protection Act 3/ Endangered Species Act 3/
13. Lands with falcon cliff nesting site, and buffer zone including prey habitat [3461.2(m)]	a. Migratory Bird Treaty Act; b. 201, 202-FLPMA Endangered Species Act	mandatory mandatory	none	Migratory Bird Treaty Act 3/ Endangered Species Act 3/
14. Lands that are high priority habitat for migratory birds of high federal interest [3461.2(n)]	a. Migratory Bird Treaty Act; b. Fish and Wildlife Coordination Act	a. mandatory b. discretionary	none	a. Migratory Bird Treaty Act 3/ b. discretion
15. Lands that are habitat for high interest resident wildlife in state [3461.2(o)]	a. Fish and Wildlife Coordination Act; b. 201, 302(b)-FLPMA	both discretionary	a. none b. valid existing rights	discretion

TABLE 3-4 (CONTINUED)

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
16. Lands that are inland wetlands [3461.2(p)]	a. 522(a)(3)(C)-SMCRA; b. Fish and Wildlife Coordination Act; c. E.O. 11990 (May 1977), National Environmental Policy Act; d. Federal Water Pollution Control Act	all discretionary	a. 522(a)(6)-SMCRA 2/ b. none c. none d. Environmental Protection Agency or Corps of Engineers permitted activities	discretion

17. Lands in 100-year floodplains [3461.2(q)]	a. 522(a)(3)(C)-SMCRA;
	b. 522(a)(3)(D)-SMCRA;
	c. E.O. 11988 (May 1977)
		all discretionary	522(a)(6)-SMCRA 2/	discretion

18. Lands used as municipal watersheds [3461.2(r)]	a. 522(a)(3)(C)-SMCRA; b. Safe Drinking Water Act; c. Federal Water Pollution Control Act	discretionary	a. 522(a)(6)-SMCRA 2/ c. Environmental Protection Agency or Corps of Engineers permitted activities	discretion

TABLE 3-4 (CONTINUED)

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
19. Lands containing National Resource Waters, and buffer zones [3461.2(s)]	a. Federal Water Pollution Control Act; b. 522(a)(3)(C)-SMCRA	discretionary	a. Environmental Protection Agency or Corps of Engineers permitted activities b. 522(a)(6)-SMCRA 2/	discretion
20. Lands containing prime farm land soils [3461.2(t)]	522(a)(3)(C)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	515(b)(7)-SMCRA; discretion
21. Lands in alluvial valley floors, where mining would interrupt or preclude farming, or materially damage water systems [3461.2(u)]	a. 510(b)(5)-SMCRA; b. 522(a)(3)(C)-SMCRA	mandatory	a. operations producing or permitted in year before 8-3-77 b. limited to a. above	510(b)(5)-SMCRA
22. Lands not reclaimable in conformity with SMCRA [3461.2(v)]	510(b)(2)-SMCRA	mandatory	none	none
23. Lands subject to a criterion suggested by a state and adopted by rulemaking [3461.2(w)]	522(a)(3)(A)-SMCRA; 522(a)(5)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	discretion

TABLE 3-4 (CONCLUDED)

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
24. Lands needed as buffer to lands designated unsuitable by a state [3461.2(x)]	522(a)(3)(A)-SMCRA; 522(a)(5)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	discretion

considered within varying degrees of specificity at various stages of Federal coal management and requiring that they receive some attention at the earliest stages of planning, and, second, providing that attention through a process that requires site-specific, for-the-record determinations of the applicability of those criteria would, the Department believes, have two beneficial results. It would make all land use planning decisions more sensitive to the resource values covered by the unsuitability criteria and would permit a level of public review and accountability not previously associated with that kind of field-level decision.

The unsuitability criteria would, in some form, be applied to all new leases, including emergency leases and preference right lease applications. The criteria would be applied directly to the tract areas for emergency and preference right lease applications. For all other new leases, the procedures set forth below would be followed.

The responsible official of the Federal land management agency would describe in the land use plan the results of the application of each of the unsuitability criteria to the medium and high potential coal lands in the planning area. He would state each instance in which a criterion is found to be applicable and show the area which is excluded from further coal development consideration or, should he determine that the conditions for an exception exist, describe the area to which the exception applies and discuss in detail the reasons why the exception is made and what type of stipulations will be required in the lease or mining permit to assure compliance with the exception. In applying the criteria and exceptions, the responsible official would first publish a composite map showing full application of all criteria prior to consideration of any of the exceptions. The map would be part of the formal documentation to be made available to the public. Only after the map has been prepared and made public would the exceptions be applied; however, the responsible official would consider using an exception only when a small area: (1) has applicable to it a criterion; (2) is in a larger area to which no criteria otherwise apply; and (3) would likely preclude the designing of any lease tracts within the larger area. This procedure deters aggressive application of the exceptions and places a distinct burden of proof on the responsible official to carefully and forcefully document any application of exceptions which he would make.

Where the quality of the data available for the application of a particular criterion or exception is high, the responsible official would decide on the basis of that data whether the area is unsuitable as set out above. Where data are unavailable or where the best available data are not of sufficient quality to allow a decision on the application of the criterion or exception to be reached with reasonable certainty, the responsible official would continue the land affected in the process and state in the land use plan when in activity planning, lease sale, or post-lease activities the additional, necessary data might be obtained. At such time as the data become available, the responsible official would be required to make public his determination concerning unsuitability, and the reasons therefore, and provide opportunity for public comment before that determination is made. Any changes which either result from petitions for designating lands unsuitable or for removing unsuitability designations or are warranted by additional data acquired in the activity planning, lease sale, or mine plan review process would be made without formally revising the plan.

All lands not identified unsuitable for coal mining would be considered further in the land use planning process. Lands with coal that would be mined by underground mining methods would not be considered unsuitable for coal mining where the mining would result in no hydrologic or surface effects. Where underground mining of Federal coal would produce hydrologic or surface effects to which an unsuitability criterion applies, those lands would be considered unsuitable unless the conditions exist to permit an exception. In predicting surface effects, the responsible official would consider surface occupancy and the potential for subsidence, fire, or other environmental impacts of underground mining which may be manifested on the surface.

As previously mentioned, the Secretary's decision to apply unsuitability criteria at the land use planning stage, as well as the post-leasing mine plan stage, was based on both public policy and economic considerations. By this policy preference, the Secretary hopes to avoid the unfortunate and possibly frequent occurrence of the following scenario: the Federal government expends considerable sums of money on a site-specific analysis for

lease sale preparation; a mining company also incurs large expenditures to determine whether it wishes to bid on the tract and (if successful in purchasing the lease) to prepare a mine plan; application of the criteria at the time of mine plan submission may suddenly make the foregoing tract unmineable or require the insertion of so many stipulations in the mine plan or mining permit as to make mining of the tract uneconomical. This scenario could be almost entirely avoided by the application of criteria first in the land use planning process. Although the criteria would be applied again at the mine plan stage, the application of most of them in the land use planning process could be done with a degree of certainty which makes any changes as a result of the second application unlikely. However, certain criteria, most notably the reclaimability and alluvial valley floor criteria, would require so much costly, site-specific data—data which would not be collected until after the land use planning is finished (in activity planning or prior to submission of the mine plan)—that the application of them in the land use planning process could only serve to screen out the most obvious areas. In the case of these few criteria, there would remain an unavoidable possibility that significant changes could occur when the criteria would be applied again after the lease has been issued at the time of mine plan submission. Note also that there are other potential criteria that might be applied at the mine plan stage but not earlier, most specifically criteria related to geologic hazards.

The unsuitability criteria would also be applied to each existing non-producing lease upon submission of a mine plan by the lessee (should an existing lease be within a land use plan area to which unsuitability criteria are being applied in land use planning the criteria would be applied to the lease at that time if a mine plan has not already been submitted.) The mine plan would be reviewed in light of the unsuitability criteria to determine which, if any, apply. If a criterion applies, the Department would evaluate whether, under an exception to the criterion, the plan could be changed to eliminate the harmful effects to the value which the criterion is designed to protect. If no change could be made and some or all types of mining could not take place consistent with the criterion, a decision would be made whether the Department has the authority to apply that criterion to the lease. If the lessee has valid existing rights and has made substantial legal and financial commitments, he may be exempted, by statute, from complying with certain of the criteria depending on the source of authority for the criteria and the dates of his commitments. If the Department is found to possess the authority to apply the criterion, the mining would not be permitted. For some criteria, the Department would have to formally designate the lands as unsuitable to prevent mining; for others, formal designation would not be needed.

Section 522(b) of SMCRA mandates the Secretary of the Interior to review all Federal lands for unsuitability and it allows citizens to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department must have procedures to apply unsuitability criteria both as part of a comprehensive Federal lands review and as part of a petition process.

Section 522(b) requires the Secretary to review all Federal lands even though many local areas are under the land managing jurisdiction of another agency, principally the Forest Service or the Corps of Engineers. By expressing a preference for the application of the unsuitability criteria to Federal lands in the land use planning conducted by each Federal surface management agency, the Department has proposed a course for the Federal lands review that would allow other surface management agencies to enter into cooperative agreements with the Department to carry out the Federal lands review on lands they administer just as the Bureau of Land Management will on land it administers. (The BLM is presently negotiating a memorandum of understanding with the Forest Service on how the latter agency would apply the criteria on national forest system lands.) For any agency that does not have the resources to accomplish such a review for lands under its jurisdiction, the Secretary would remain obligated to conduct a review on those lands.

With respect to lands administered by BLM, the Under Secretary on July 5, 1978, approved a delegation of authority that gives BLM the responsibility to administer the Federal lands review through its land use planning system and the Office of Surface Mining Reclamation and Enforcement (OSM) the responsibility to administer the statutory petition process. (Appendix B to

the Federal Register Notice of December 8, 1978; 43 Federal Register 57662, 57666-57668).

The Federal lands review under Section 522(b) of SMCRA would be conducted in accordance with the procedures discussed above for application of the unsuitability criteria during land use planning or upon submission of a mine plan. The Federal lands review is not a program for the designation of lands as unsuitable for mining. Formal designation of Federal lands as unsuitable would occur only in response to a petition to designate under Section 522(c) of SMCRA. Petitions would be filed with OSM under the division of responsibility established on July 5. Section 522(c) requires the petitioner to be adversely affected by potential mining of the lands in question, and requires each petition to "contain allegations of facts with supporting evidence" to establish the truth of the allegations. Because of these threshold requirements, it is assumed that the public lands will not be blanketed by petitions. On those petitions that do pass the threshold requirements, designation as unsuitable, rejection of the petition, or termination of a prior designation would have to occur within one year. The year provides the time in which the BLM (or other land management agency) would substantively review the petition and, if necessary and possible, examine the tract, and in which a public hearing on the petition would be held and a written decision rendered. The OSM would refer each petition to the BLM or other appropriate land management agency for its review and the results of that review would be presented at or before the hearing. The BLM or other agency would also be able to petition OSM on its own behalf to designate Federal lands as unsuitable.

While the criteria applied in the Federal lands review and the petition process are the same, it is important to note that OSM, not the land management agency, controls the outcome of the petition process. It may be that certain lands which would not be found to be unsuitable in land use planning might be designated unsuitable upon petition, and, conversely, lands deemed unsuitable by the land management agency might not be designated unsuitable upon petition. This is possible because the unsuitability criteria themselves, and their exceptions, are, in origin and function, designed to ensure environmental protection and establish mitigation of adverse impacts, while the formal designation process requires consideration of coal demand and the socio-economic impacts in carrying out the environmental purposes served by the criteria. Section 522(d) of SMCRA requires OSM to prepare, prior to designating Federal land unsuitable, a "detailed statement on (i) the potential coal resources of the area; (ii) the demand for coal resources, and (iii) the impact of such designation on the environment, the economy, and the supply of coal." In order to assure the greatest consistency between OSM's unsuitability designations and BLM's or other land management agency's land use planning unsuitability assessments, the BLM's proposed coal management regulations (Appendix A, Section 3461.4-3) require that the same "detailed statement" be made by BLM to document its unsuitability assessments when it adopts a land use plan.

3.2.2.3 Multiple Use Resource Management Decisions. Although it is likely that most major conflicts between coal and other resources would be addressed during the application of the unsuitability criteria, significant resource balancing decisions could remain. These other resource trade-offs would be considered and acted upon after application of the unsuitability criteria. The adjustments at this stage in the land use planning process would be made to accommodate unique, site-specific resource values clearly superior to coal but which are not included in the criteria. A prime recreation site or campground might be an example. The responsible official would balance these values against the value of possibly offering additional coal from the planning unit.

3.2.2.4 Surface Owner Consultation. Section 714 (d) of the Surface Mining Control and Reclamation Act of 1977 requires the Secretary to consult during the planning process with certain owners of the surface estate overlying Federal coal resources being considered for leasing. This forms another screen for identifying lands that should not be leased.

In order to minimize disturbance to surface owners from surface coal mining of Federal coal deposits and to assist in the preparation of comprehensive land use plans required by Section 2(a) of the Mineral Leasing Act of 1920, as amended, the Department would consult with any surface owner as defined in Section 714(e) of SMCRA whose land might be included in a leasing

tract and ask the surface owner to state his preference for or against the offering of the deposit under his land for lease. It would also request disclosure of any consent for mining already given by the surface owner. The Department would, to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining in areas where a significant number of qualified surface owners state a preference against the offering of the deposits for lease. Although portions of these areas might still be designated as acceptable for further consideration for coal leasing, the land use plan would contain the recommendation that no leasing take place in the areas unless there are no acceptable alternative local areas available to meet the leasing target for the entire coal region.

The Department is considering an additional policy applicable to the surface owner consultation process and is soliciting public comment on that policy, in particular comments on the proposed regulations (see Section 3420.2-3(d) in Appendix A). Under this policy, the Department would provide on the consultation form a place for the qualified surface owner to register not only his preference for or against surface mining of his land but also whether he has a firm intent not to consent to such mining during the life of the land use plan (a maximum of 15 years in the BLM's proposed planning regulations). After the surface owner consultation screen has been applied and the local land manager (1) has determined each general area in which a significant number of qualified surface owners has expressed a preference against leasing and (2) has made a determination concerning the removal of those preference areas from the areas which the land use plan will identify as acceptable for further consideration for leasing for the surface mining of coal, the disclosures of firm intent not to consent would be considered. Those specific lands covered by firm intent disclosures would be removed from any further consideration for leasing for the surface mining of coal in the land use plan.

As a consequence of these procedures, any land covered by a firm intent disclosure on the consultation form would not be considered for leasing again if the coal were to be developed by surface mining methods for the life of the land use plan even if a preference area encompasses it and the BLM decides to lease in that area under the limited exception discussed above. The only exception would be when the ownership of the land changes and the new owner either is not a qualified surface owner or is willing to file a written consent to surface mining, *and* the land management agency elects to amend the land use plan.

Should the surface owner not be willing to make a decision at this point, he would still be able to exercise his surface owner protection rights under the subsequent consent acquisition procedures of the preferred program (see Section 3.2.5.1).

3.2.2.5 Threshold Development Levels. Although many land use decisions can be made on a site specific basis (as previously suggested, such a decision might be that a particular area should be developed as a recreation site rather than leased for coal), other decisions may be oriented more toward impacts dependent on levels or rates of development. Although any one of several given potential coal development sites under consideration might have an acceptable impact by itself, the total impact to the area of developing all sites could be intolerable. As an example, the crucial habitat area for a particular species might have been removed from further consideration for leasing. The species do, however, use additional areas within the land use planning unit. Coal development in these areas might adversely affect the species' population. During the land use planning process, a decision might be made that a 10-percent decrease in the population would be an acceptable trade-off. Given the protection of the crucial habitat area, it might not make a difference what other areas would be temporarily lost to coal development as long as the total would not exceed a certain acreage or decrease the population more than the agreed upon amount. In this situation, no additional land would be removed from further consideration for coal leasing. Instead, a threshold constraint would be established in the land use plan to specify the total level of habitat reduction within the acceptable areas identified in the plan.

This threshold concept is particularly appropriate when considering socio-economic impacts. The social and economic infrastructure which coal development in the land use planning area would affect might, over a certain time period, only be able to support a particular developmental level.

Also, the rate of development might be critical. If this information is available, a recommended threshold leasing or development level and rate could be specified in the plan.

It is not necessary to establish thresholds in the land use plan. The later steps in the activity planning process supply opportunity for the Department, other Federal agencies, state and local governments, and others to discuss and agree upon regional and subregional thresholds. If, however, the land use planning process reveals the need for a particular threshold on the scale of a planning unit, then the decision could and should be made at that point.

In a March 8, 1979, memorandum to the Director of the Bureau of Land Management, the Assistant Secretary, Land and Water Resources, requested that the Bureau undertake as a high priority task the further intensive development of the threshold concept. The study is to be conducted in the context of the Bureau's land use planning system, and is to consider use of the threshold concept not just for the coal resource but also for the other resources addressed in the planning process. The Bureau was further requested to incorporate the threshold concept into its final planning regulations.

3.2.2.6 Preferred Coal Leasing Areas. Within the areas identified as acceptable for further consideration for coal leasing, the land use plan could delimit preferred coal leasing areas. This would be done only when available coal demand data suggest that the areas acceptable for further consideration for coal leasing clearly could yield more coal than would be needed for leasing before the land use plan would be reviewed (five years in the BLM's proposed planning regulations). Preferred areas would be identified by employing available socio-economic, environmental, and economic data. These preferred area identifications would be advisory only to the regional coal teams and not a plan commitment.

All of the land use planning steps in the preferred program could be made a part of any of the alternatives since land use planning must be done even if the Department decides not to adopt a coal management program. This component is least compatible with the lease to meet industry needs alternative particularly as it requires the land use planners to set threshhold development levels. Under the lease to meet industry needs alternative, the Department would rely on the market place to set the various thres hold levels. Application of the unsuitability criteria would be postponed until the mine plan stage. Planning would focus only on those areas for which there had been nominations.

3.2.3 Activity Planning.

Two consecutive processes would be undertaken in activity planning in the preferred program: tract delineation and tract ranking, selection, and scheduling (see Figure 3.3). The first process would take place in each land use plan area; the second would be conducted over the entire coal region encompassing many land use plan areas.

3.2.3.1 Tract Delineation and Industry Expressions of Interest. As previously noted, the land use plans would disclose areas which are considered to be acceptable for further consideration for coal leasing. These areas would *not* be lease tracts and would be much larger than any acreage which might be needed for leasing over the next 10 years (the lengthiest period which would be used for setting regional leasing targets (see Section 3.2.4)). The purpose of activity planning is to delineate and select a sufficient number of tracts for sale from the areas designated in the land use plans as acceptable for further consideration for leasing to meet the regional leasing target. The first step after publication of the land use plan is to preliminarily delineate potential lease tracts. In delineating the preliminary tracts, the land management agencies would consider the following factors:

- Expressions of interest and existing or planned operations on adjoining lands.
- Technical coal data, including reserve tonnage, rank, sulfur content, seam thickness, and ratio of recoverable coal to reserves.
- Conservation considerations, including calculation of preliminary maximum economic recovery, land ownership patterns, and the formation of logical mining units.
- Surface ownership, including the results of surface owner consultation, and the existence of surface owner consents and their terms.
- Prior regional leasing targets and guidance from the regional coal teams.

Although preliminary tract delineation would be done by the Department, the first step in the

delineation process would be to request submissions by industry of expressions of interest for leasing. As previously discussed, a call for expressions of leasing interest would be made only after areas acceptable for further consideration for coal leasing have been identified in the Bureau of Land Management or Forest Service land use plans. In areas where state or other agency plans have been adopted, unsuitability criteria would be applied before a call would be made. The call would be made before any tract boundaries would be delineated and the expressions of leasing interest would be the most significant information employed in delineating the tracts. It is expected that any tract proposed in expressions of leasing interest would be preliminarily delineated as proposed, unless it was necessary to not delineate it, delineate it differently, or delineate other tracts to ensure competitive interest in the eventual lease sale, conserve Federal coal, or meet other largely economic objectives in the coal management program.

In addition to industry, any individual, state, or public body would be able to respond when the Secretary issues a call for expressions of leasing interest. All calls would provide a description of the kind of information required, including but not limited to location and quantitites of coal desired, date lease would be desired, proposed use of coal, technical coal data, commitments with private surface owners and adjacent landowners or lessees, and basic development proposals. Expressions of interest against leasing which were possible under the 1975 proposed program (EMARS II) would not be accepted; however, a similar purpose would be served by unsuitability petitions in the present preferred program. Public inspection and copying of information submitted with the expressions of leasing interest would be permitted in accordance with Departmental regulations.

Notice of each request for expressions of leasing interest would be published in the Federal Register and in the general circulation newspaper(s) in the coal region. This notice of request would specify the area or areas involved, information required, the period of time within which expressions may be submitted, where to write for further information, and where to submit the expressions.

The fact that a specific request for expressions of interest would be part of the activity planning system would not preclude industry, the states, or other parties from participating in the earlier land use planning efforts. General comments and interests could be submitted during the planning process or whenever any party might wish to indicate an interest in Federal coal in a particular area. Such general comments and interests could be in the form of a letter or public testimony. The Department would use this information for planning purposes or to aid in setting the regional production goals and leasing targets.

Tracts would not be identified as special opportunity lease sales for public bodies or small businesses during tract delineation. However, if special leasing opportunity sales are contemplated in the region, an effort to identify tracts of an appropriate size and location would be made at this stage of the process. In order to initiate Departmental action to identify potential public body lease sale tracts, interested public bodies would have to submit formal expressions of leasing interest in response to the notice calling for expressions of leasing interest. Although potential small business candidates would be encouraged to submit formal expressions of leasing interest, they would not have to initiate tract identifications for small business special leasing opportunities. Rather, in consultation with the Small Business Administration, the Department would delineate tracts to go into the ranking process which could meet the needs of small businesses. The Small Business Administration proposed a definition of a small business for Federal coal lease sale set-aside purposes on March 14, 1979 (44 Federal Register 15513-15514).

In the months before the schedule is established, all available preliminary tracts would be reviewed for the adequacy of the tract information profile. Data insufficiencies would be noted and, where time permitted, remedied so that each tract would have as complete a coal resource, socioeconomic, and environmental profile as possible. Also, unsuitability questions left unresolved in general planning would be analyzed and tract-specific stipulations written at this time.

3.2.3.2 Regional Tract Ranking, Selection, and Scheduling. If a regional leasing target established for any given region suggests the need for Federal coal leasing over the up-coming two or four years, a proposed lease sale schedule would be prepared.

Every two or four years, the Director of the BLM would formally begin the regional tract ranking and selection process. Ranking would be on a coal region-wide basis and not separately within each land use planning area. In the ranking process, factors relating to coal economics, ease of reclamation, proximity to existing transportation facilities, class of surface ownership (Federal or non-Federal), and socioeconomic and other environmental concerns would be employed. Ranking would be for general levels of acceptability only. The regional coal team would be expected to emphasize those factors of importance to the region. The ranked tracts would be compared with the regional leasing target and a set of tracts would be selected for a proposed lease sale schedule. Since the potential environmental and social impacts resulting from development of any tracts in the same area would be cumulative, the selection of the first tract might preclude selection, or lower the priority of, other highly ranked tracts. Accordingly, as selections are made of individual tracts, the original rankings of the remaining tracts might be altered and the final, selected tracts would not necessarily directly correspond to the relative order in which the individual tracts were originally ranked. The number of tracts proposed would be dependent on the type of bidding system to be used (intertract or single tract bidding) and the tonnage targetted for lease. The selected tracts would be placed in a proposed regional lease sale schedule.

The tract ranking and selection process would be conducted in close coordination with the governors of the states comprising the region and in consultation with all affected Federal land management agencies and other Federal and state agencies with expertise of relevance to the process. To facilitate this coordination and consultation, a Department/state regional coal team would be established for each of the major multi-state coal regions. The team would consist of a BLM field representative and a state government representative from each state within the region. An additional member appointed by, and directly responsible to, the Director of the BLM would be assigned to each team and serve as its director. In addition, procedures would be established to ensure that the Federal land management agencies and the other Federal and state agencies with expertise would participate during the ranking process.

Each regional coal team would consider and suggest policy for regional production goal and leasing target setting, tract delineation, and site-specific analysis in the coal region. It would guide and review tract ranking, and conduct the tract selection and sale scheduling procedures that develop the alternatives which are analyzed in the regional lease sale environmental impact statement and are recommended to the Secretary. If any state representative should disagree with the Federal team members' ranking decisions or selection and scheduling recommendations and a compromise could not be reached, his opinions would be documented and his alternative recommendation would be treated equally in the regional lease sale environmental impact statement sent through the Director, BLM, to the Secretary for his decision. The ultimate decision-making authority for the selection and scheduling of tracts for lease sale resides in the Secretary.

A notice of intent to rank and select tracts to be included in a proposed regional lease sale schedule would be published in the Federal Register and selected general distribution newspapers within the coal region not less than 30 days before the ranking process begins. The notice would contain a description of the tracts to be ranked and procedures under which any interested parties are to be involved in the process. Also a final call for surface owner consent filings would be made for the tracts to be ranked.

Detailed profile information on each of the tracts ranked would be available for inspection in the Bureau of Land Management offices in the coal region. Those parties interested in commenting on the results of the tract ranking and selection process would have the opportunity to do so in the regional lease sale environmental impact statement process before any final decision would be made by the Secretary to accept the proposed lease sale schedule or hold a lease sale encompassing any of the selected tracts. It is the intent of the Department that the development of the regional sale schedule and the environmental impact statement for the regional sale be closely integrated. This would be done by integrating the decision and analyses documents used for sale schedule development with the statement. Some special efforts will be needed for the statement alone after preliminary identification of a sale schedule, but this work would be limited. This procedure would

be in accord with the new Council on Environmental Quality regulations for preparation of environmental impact statements.

The tract ranking and selection decisions would normally be reconsidered every two years in accordance with the updating of the national and regional production goals and leasing targets. The Secretary might, in consultation with the governors of the affected states, intiate or postpone the the tract ranking and selection process to respond to considerations such as major planning updates, new preliminary tract delineations, and increases or decreases in the level of leasing.

To establish planning and inventory-related priorities, the Secretary might include in the ranking process areas recently identified in new land use plans or plan updates, or recently designated, as areas acceptable for further consideration for coal leasing which have not yet been delineated as preliminary lease tracts. All tracts subsequently identified for lease consideration would be formally entered into the ranking and selection process before they are included in a lease sale proposal.

Activity planning would not occur under the no new leasing alternative and would have relatively little importance under the preference right lease application and the emergency lease only alternatives. Under the lease to meet industry indications of need alternative, activity planning would take place only in response to industry nominations, and regional tract ranking and selection would not occur. The process described here would be consistent with the lease to meet DOE production goals alternative. Under the state determination of leasing levels alternative, the control over activity planning would be transferred from the Bureau of Land Management to the states.

3.2.4. Setting Regional Production Goals and Leasing Targets.

Over the past several years the question of the need for leasing has been a focal point of much of the controversy surrounding the Department's efforts to manage the Federal coal resource. Considering the several years' lead time needed for developing mines to the point of production and the similar time frames for planning and constructing coal-consuming power plants, precise determinations now of the tonnage of Federal coal which should be leased to meet the Nation's future energy requirements are not feasible, although estimates can be made on the basis of available information and projections.

Chapter 2 of this document provides an examination of the national energy role of Federal coal, including an assessment of the need for leasing. The need for leasing involves both meeting national energy objectives and improving coal development patterns for a given amount of coal production. This analysis, together with the overriding consideration that the Department requires a coal management system in place to respond promptly to leasing needs when they are determined, is the basis for the Secretary's preference for a Federal coal management program which has the capability to initiate new competitive lease sales. However, the Secretary realizes that, no matter how good the analysis of need for leasing may be in Chapter 2, circumstances seldom remain sufficiently constant, and forecasts are not often precise enough to permit the competitive leasing component of a coal management program to function continuously on the basis of a single assessment of leasing needs. Accordingly, the Secretary chose to make a continual reassessment of leasing needs an integral and very public part of the preferred program. The preference is for a process which merges DOE production goals with advice from state and local governments, the coal industry, and other interest groups to determine leasing levels. This process of continual reassessment of future regional coal needs would permit modification of leasing activity in response to changes in projected demands for coal.

The major coal bearing areas of the continental United States have been divided into 12 coal regions as shown in Figure 1-1. Eight of these regions contain significant reserves of Federal coal (see Appendix H). Under the preferred program, these eight coal regions would serve as the basic units both on which the assessment of desired levels of leasing would be centered and in which tracts would be ranked, selected, and scheduled and lease sales conducted. The Department of Energy (DOE), pursuant to the responsibilities assigned to it by the Department of Energy Organization Act, would establish and biennially update five, 10, and 15-year regional coal production goals which would guide the Department of

the Interior in its decisions on the number and timing of lease sales.

Under the terms of the Memorandum of Understanding between the Departments of the Interior and Energy set out in Appendix B, the Secretary of Energy would submit proposed DOE regional production goals to the Secretary of the Interior. The supporting material for these proposed goals might include an indication of probable need for coal by major type; however, in determining regional goals for specific types of coal, the Secretary of the Interior would be guided mainly by industry indications of interest submitted at the start of the activity planning process. The Secretary of the Interior would, within 60 days, comment to the Secretary of Energy on any potential conflicts or problems which the Interior Department foresees in the DOE regional production goals as proposed. These comments would be based on the Interior Department's responsibilities for the management, regulation, and conservation of natural resources; the capabilities of Federal lands and Federal coal resources to meet those goals; and the national need for the coal balanced against the environmental consequences of developing it.

These comments would, of necessity due to the short comment period, focus on immediately perceivable problems and conflicts and would not include in-depth analyses of issues which can only be undertaken after consultation with field personnel, the states, industry, and the public. It is expected that, during the preparation of the regional production goals, the Department of Energy would focus mostly on macroeconomic issues concerning the energy needs of a healthy national economy and would consider comments from diverse sources on the formulation of national energy goals and the role of coal production in meeting those goals. Within 30 days after receiving the Secretary of the Interior's comments, the Secretary of Energy would transmit to him final DOE national and suggested regional production goals.

The Secretary of the Interior would then look to the expertise and viewpoints of the regional coal teams (see Section 3.2.3.2) as the major source of information and comment on the final DOE regional production goals and how they might affect leasing strategies and decisions. The Secretary would transmit the relevant DOE goal to each team. The team, in turn, would analyze the goal on the basis of its tract ranking and selection experience, its detailed knowledge of the region, and public comments it receives on the goal from publication in the Federal Register and a hearing in the region. The team would report back to the Secretary any adjustments it feels are necessary in the relevant DOE regional production goal and the reasons for those adjustments. The team would also provide the Secretary with its suggestion for a regional leasing target (on a reserve tonnage basis) for the next four year period.

Based on the recommendations of the teams and other information available to him, the Secretary of the Interior would adopt the final DOE regional production goals either without change or after making adjustments to them. He would transmit the final DOE goals, as adopted with or without adjustments, to the Secretary of Energy and publish them in the Federal Register. The goals adopted would be used by the Department for long range coal management program planning and would be made available to the states, local governments, and other bodies for their use.

The Secretary of the Interior would also adopt preliminary regional leasing targets for logical mining units which would be composed of or include Federal leases, again after consideration of the teams' recommendations and other information available to him.

These preliminary regional leasing targets would reflect primarily the difference between desired levels of production in the region and the estimated production without new Federal leasing. They would include the Federal and non-Federal coal that enters production because of Federal leasing. Among other factors which might be affected by leasing decisions and which the Secretary would consider in establishing preliminary regional leasing targets would be competition within the industry and environmental problems associated with the existing pattern of leases and mines in the regions.

The Secretary would publish the preliminary regional leasing targets in the Federal Register and transmit them to the regional coal teams.

Among the sources of information which the Secretary would consider in making any adjustments to the final DOE regional production goals and in establishing the preliminary regional leasing

targets would be statutory requirements; Departmental policies; land management requirements in land use and activity plans; the analyses in this programmatic environmental impact statement; environmental impact statements on the delineation, ranking, and selection of tracts; and reports and studies by governmental agencies, trade associations and companies, universities, and other institutions and organizations. The Secretary might also call a national conference of the regional coal teams to discuss their individual recommendations and the sum effect of those recommendations. After publishing the final DOE regional production goals and the preliminary regional leasing targets, the Secretary would consult directly with the governors of the affected states to learn their views, particularly with respect to the relationship between the preliminary regional leasing targets and potential social and economic effects on the states and regions. Based on the information he receives through all of the above procedures, the Secretary would publish in the Federal Register and transmit to the regional coal teams, final regional leasing targets.

The final DOE regional production goals, as adopted by the Secretary, and the preliminary and final regional leasing targets would be used by the Federal and state governments to set data gathering and planning priorities to ensure that a sufficient number of tracts would be delineated in the future, and that adequate site-specific information would be available, to make the coal management process workable. The final regional leasing targets would specifically guide the regional coal teams in the selection and scheduling of ranked tracts for the four-year proposed lease sale programs in their respective regions.

The regional tract ranking and selection process would consistently indicate the optimum tracts for the desired level of development and lead to thorough analyses of the impacts of at least one but usually several alternative lease sale schedules at the target level. These analyses could include an alternative or alternatives of choosing a combination of tracts for leasing which would result in a leasing level above or below the level called for in the final regional leasing target for a particular region. Among the reasons for proposing leasing above or below the final target during the scheduling process might be the results of the analysis contained in the regional lease sale environmental impact statement; expressed industry interests not taken into account earlier; the interest of communities or regions in promoting or avoiding coal development in the near future; interest in special opportunity sales; sales experience with the ongoing regional lease schedule; or an expressed desire on the part of a state to shift or disperse coal development patterns. Any proposed divergence above or below the final regional leasing target would be discussed and explained in detail by the regional coal team in the draft regional lease sale environmental impact statement, and public comment would be specifically requested on the proposal in the public participation process on the draft statement. The Secretary would specifically consider the analyses and comments on the proposed divergence from the leasing target at the time he makes his decision on a lease sale schedule.

In the regional tract ranking and selection process, the possibility of trade-offs in production goals and leasing targets between regions could not be adequately analyzed. This must be considered during the next biennial process in which the production goals and leasing targets are set or revised. The first time the process of determining regional leasing targets would be conducted, the interregional analysis included in this programmatic environmental impact statement would be used as a basis for the decisions on the targets after providing for state consultation and public comment.

In the subsequent biennial revisions of regional production goals and leasing targets, the information and analyses generated in the preceding regional tract ranking and selection process would provide useful information for the goal and target decisions. In the previous tract ranking and selection process, alternative tracts to the ones finally chosen would have been analyzed. Those highly rated but previously unselected tracts would most likely serve as an important pool of tracts for the selection of tracts to meet the new regional production goals and leasing targets. If the unchosen tracts remaining in one region are clearly superior to most of those remaining in another, consideration of interregional trade-offs in the setting of the new regional production goals would be appropriate. This overall interregional analysis of the tracts makes the development or update of the regional production goals at this stage quite important. The biennial regional leasing targets

derived from the production goals would be used for either guiding new four-year lease sale schedules at the end of the existing schedules or amending existing lease sale schedules after the first two years of their four-year terms.

These procedures for setting regional production goals and leasing targets would be followed only under the preferred program. Under the no new leasing, preference right leasing, and emergency leasing alternatives, the procedures would not be needed. They are incompatible with the lease to meet industry indications of need alternative which relies on industry nominations to resolve the question of leasing levels. Similarly they are unneeded with the lease to meet DOE production goals and the State determination of leasing levels alternatives which rely on DOE and the states, respectively, to set the levels of development for Federal coal.

3.2.5. Pre-Sale and Sale Procedures

From the time a tract is selected for sale at the conclusion of the activity planning stage, until a lease can be issued, a series of actions would be required to meet various statutory and administrative requirements (see Figure 3-4).

3.2.5.1 Split Estate Leasing and Surface Owner Consent. Under the original homestead laws, ranchers and farmers were granted both the surface and mineral rights to their land, but later homestead laws provided for retention of the mineral estate by the Federal government. The majority of split estates involving federally-owned mineral rights originated out of entries made under these later homestead laws. The retained mineral estate included the right to enter and mine at any time in the future. The private owner of the surface estate did not have the power to prevent mining, though he or she was guaranteed some degree of indemnification for damage. The most important of these homestead laws is the Stock-Raising Homestead Act (30 U.S.C. 299) which states at section 9:

> Any person who has acquired from the United States the coal . . . in any such land, or the right to mine and remove the same, may reenter and occupy so much of the surface as may be required for all purposes reasonably incident to the mining or removal of the coal . . . first, upon securing the written consent . . . of the homestead . . . patentee; second, upon payment of the damages to crops or other tangible improvements . . . ; or, third, . . . upon the execution of a good and sufficient bond.

Section 714 of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) provides that, in cases where Federal coal is overlain by private surface owned by a special class of owners, the Secretary may not issue a coal lease for surface mining purposes unless the surface owner has granted, in writing, valid consent to conduct such mining operations. Members of this special class of surface owners are defined as persons who:

- Hold legal or equitable title to the land surface; and
- Have their principal places of residence on the land or personally conduct farming or ranching operations on the land or receive a significant portion of their income from farming or ranching the land; and
- Have met these two conditions for at least three years prior to granting their consent.

The section further provides that valid consents granted prior to the date of the Act (August 3, 1977) will be deemed sufficient for complying with the section regardless of the consent terms.

Section 714 also requires that surface owners be consulted during land use planning. The provision reads:

> In order to minimize disturbance to surface owners from surface coal mining of Federal coal deposits and to assist in the preparation of comprehensive land-use plans required by section 2(a) of the Mineral Lands Leasing Act of 1920, as amended, the Secretary shall consult with any surface owner whose land is proposed to be included in a leasing tract and shall ask the surface owner to state his preference for or against the offering of the deposit under his land for lease. The Secretary shall, in his discretion but to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining techniques in those areas where a significant number of surface owners have stated a preference against offering the deposits for lease.

This consultation requirement differs sharply from the consent requirement. Whereas the consent requirement is related to the activity planning process, is mandatory, and concerns an individual's authority to prevent surface mining on his specific land, the consultation requirement is related to the land use planning process, provides limited discretion to the responsible Federal official, and concerns the authority of a group of individuals to influence surface mining on a wider area encompassing their individual properties. The

consultation step under the preferred program is described in Section 3.2.2.4.

Several issues were raised in considering how Section 714 might affect the structure and implementation of a Federal coal management program. The questions are not trivial; of the 9.7 million acres of Federal lands classified as containing technically recoverable coal in the six principal western coal states, 6 million acres are overlain by private surface (see Table 2-5). Of course, the amount of private surface owned by surface owners as defined by Section 714 will be much less than the full 6 million acres, but is still expected to be significant.

The legislative history of Section 714 was stormy. The measure was proposed to protect the property of farmers and ranchers who face the risk of being moved off their land to make way for surface mining. The Congress considered amendments expressly limiting compensation paid for surface owners' consents, and the Senate version of SMCRA empowered the Secretary to override the surface owner if leasing would be in the national interest. The provision agreed to by the conference committee, and signed by the President, however, included no compensation limitation or override.

SMCRA does stipulate that Federal coal underlying the private surface is to be leased in accordance with the Mineral Leasing Act of 1920, as amended. This law prohibits the government from accepting any bid which is less than the fair market value of the coal, as determined by the Secretary, and requires, with only minor exceptions, that all Federal coal be sold competitively. According to the Department's Office of the Solicitor, "... the conflicts between surface owner consent and the Secretary's obligations under the Mineral Leasing Act are ... subject to reasonable regulation under the terms of Section 32 . . ., 30 USC 189, which provides, 'The Secretary ... is authorized to prescribe necessary and proper rules and regulations and to do any and all things necessary to carry out and accomplish the purposes of this (Act) "[3]. The Act, therefore, is interpreted as giving the Secretary the authority to regulate the leasing process to meet the two purposes of ensuring that leases are sold on a competitive basis and that fair market value is received for the coal. Specifically, the Secretary may monitor surface owner consents to ensure their form and financial terms do not substantially affect fair market value or the competitive nature of the lease sale and, should these terms threaten the public interest, decline to proceed with that lease sale or to execute the lease.

Therefore, the guiding principal in interpreting the possible consequences of Section 714 is that, even if consent has been given, the section does not prohibit the Secretary from exercising his discretion not to lease.

Tracts would be delineated and ranked regardless of the ownership of the surface. In the selection of tracts for sale, a preference would be accorded tracts where the surface is federally owned in favor of tracts where the surface is in private ownership (other factors being nearly equal). For tracts where the surface is owned by qualified surface owners, a preference would be given to those tracts where BLM has received evidence of consent by the time of ranking over tracts which still require consent.

Two interrelated issues considered by the Secretary in selecting issue options for the design of the preferred program were when during the tract delineation, ranking, and selection process surface owner consents would be acquired, and who should acquire consents—the Federal government or industry. These two questions are set out below in a matrix of possible program choices:

WHEN	*WHO* *INDUSTRY*	*BLM*
1. Contemporaneous with surface owner consultation (planning)	Not feasible	Yes, passively for those willing to volunteer
2. Adjunct to obtaining industry expressions of interest	Yes, as part of interest submission	Not applicable
3. Beginning with tract ranking and continuing through tract analysis	Feasible	Feasible
4. Prior to offering for sale	Feasible	Feasible
5. After sale, but before executing lease	Feasible	Not feasible

In studying these two issues, the following factors were considered:

- The later in the process surface owner consent is obtained, the less would be the administrative costs of obtaining consent

no matter who acquires it. Administrative costs would be somewhat mitigated by tying them to steps in the coal management program where contact must be made for reasons other than surface owner consent: that is, during suface owner consultation in land use planning and during submissions of industry expressions of leasing interest at the beginning of activity planning.

- The later in the process, the more information the surface owner would have available to make his decision and, presumably, the stronger would be his bargaining position.
- The later in the process, the greater would be the risk to the government of loss of the time and money spent on evaluating and analyzing coal leasing tracts.
- The less direct involvement the BLM has, the agency's administrative costs would be lower and its vulnerability to charges of government interference would be less.
- The less direct involvement the BLM has, the less capable would be government to monitor compensation for the purposes of complying with the fair market value requirements of the Mineral Leasing Act of 1920.

The Secretary preferred that industry be responsible for acquiring surface owner consent for the surface mining of tracts of Federal coal whenever such consent is required by Section 714 of the SMCRA before a lease can be executed. Consents would be required to be filed with the BLM prior to the sale announcement. Industry (as well as the states and the public) would be supplied with the preliminary tract ranking to give potential bidders an indication of the likelihood certain tracts would be scheduled for sale in the coming four years. Industry would be encouraged to advise the BLM when consent negotiations fail so that unnecessary site specific analyses would not be undertaken. If no filing of consent is made on a tract before the notice of sale, the tract would be removed from the sale schedule (and, if necessary, another tract substituted for it).

If a qualified surface owner who firmly intends not to provide consent to surface mine his land could prevent the leasing of his land for surface mining only by withholding his consent, the result could be unnecessary interference in his life and unnecessary costs for the Federal government. If the surface owner simply withholds his consent, no lease could be sold; but he might have to watch a tract containing his land go entirely through tract delineation, ranking, and selection and scheduling for sale. This would certainly result in continued presence on his land of Federal and perhaps, private company, employees conducting site-specific analyses and might cause him to continue to receive unwanted overtures from potential consent purchasers. The Federal government would continue to expend time and resources in fruitlessly planning that surface owner's land for leasing for coal surface mining.

In order to avoid this situation, a qualified surface owner who owns land in an area identified in the land use plan as an area acceptable for further consideration for leasing and, if leased, would be surface mined, could submit a statement to the local office of his refusal to provide consent. The statement would have to be in writing and confirm that the surface owner has not previously given consent to mine and that he will not for the expected future life of the land use plan (a maximum of 15 years under the BLM's proposed planning regulations). Upon receipt of that statement, the BLM would remove the Federal coal underlying the surface owner's land from further consideration in the ongoing activity planning process or any such processes conducted in the future until the land use plan is revised or until the ownership of the surface estate changes. Upon revision of the land use plan, the surface owner would be notified that his prior written submission has expired and he would be given the opportunity to submit another statement. Also, whenever industry or other groups notify the BLM of a suface owner who has refused to provide his consent to a potential consent purchaser, that owner would be given an opportunity to submit a statement of refusal to consent.

If the price of surface owner consent remains unlimited and the government makes no effort to receive fair payment for its coal, the cost of obtaining consent could easily reduce the amount which a lessee is able and willing to pay the government for the opportunity to recover coal. If the cost of consent is sufficiently large, bids submitted for Federal coal leases arguably would not provide the fair return which the Congress intended to flow to the public from the development of the coal. To ensure receipt of fair market

value for Federal coal, the Department, in calculating the fair market value figure above which bids must be made if the lease is to be sold, would assume a ceiling cost of obtaining surface owner consent based on losses and costs to the surface estate and operation. This procedure could indirectly limit the amount paid to a surface owner for consent to mine underlying coal unless the company can find other ways to absorb the cost of exceeding the ceiling.

Requiring industry to negotiate consents not only transfers the negotiation costs to industry from the government, but also imposes on one company (the holder of the consent) the risk of bearing the surface owner consent costs for the lease of another (the successful bidder). The effect of this policy would be to discourage coal companies from negotiating consents except in cases where they felt they might have a strong competitive edge. This problem would be resolved by requiring that any tract containing an area to which applies a surface owner consent negotiated after the enactment of SMCRA could be placed in the sale only if the consent is transferable to a third party. A surface owner consent agreement would be considered transferable only if it provides, in part, that after the lease sale (1) the payment for the consent is to be made by the successful bidder directly to the qualified surface owner or (2) the successful bidder is automatically permitted to acquire the consent by reimbursing the company which first obtained the consent for its original purchase price.

Consents given prior to the enactment of SMCRA (often under state laws) were validated under Section 714 regardless of the consent terms. Therefore, the Department cannot require that these consents contain provisions which provide for their transferability. To ensure competitive sales, the Secretary expressed a preference for an issue option which provides that tracts which are selected for lease sale and which include areas covered by consents given prior to the enactment of SMCRA would be offered for sale individually only if the consents are determined to be transferable. If the consents are determined to be nontransferable, the tract would not be offered for sale unless it is included in an intertract sale (see section 3.2.5.4).

3.2.5.2 Environmental Analysis and Lease Stipulations. The BLM would conduct an environmental analysis for each tract proposed for lease sale to develop and refine lease terms and stipulations. In general the information on which this report would be based must be sufficiently detailed so that the Department could be reasonably certain that the lease would be economically and environmentally acceptable, but in less detail than would be required of a lessee at the time a mining plan would be approved.

Certain environmental considerations, such as hydrology, archaeology, and reclamation require intensive drilling or field surveying which are more easily and cheaply conducted as part of a lessee's pre-mining plan permit approval activities. The Department would make preliminary decisions on these environmental considerations at the time of lease sale based on modelling or less intensive surveys and would stipulate the detailed data which would be collected as part of the mining plan approval process.

3.2.5.3 Fair Market Value. The Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976 (FCLAA), specifically mandates that, "No bid shall be accepted which is less than the fair market value, as determined by the Secretary, of the coal subject to the lease."

The basic methods for evaluating fair market value would be comparable sales analyses and discounted cash flow analysis. The discounted cash flow analysis involves calculating annual costs and income resulting from the development of a property under realistic conditions. This method is currently being used by the Department to determine fair market value for those tracts being leased under the NRDC v. Hughes agreement.

Before the Department makes any determination on fair market value on a tract, the public would be given the opportunity to comment. Comments would be solicited on fair market value consideration for any tract being offered (especially on the values that should go into the fair market value determination), as well as on the related decision of maximum economic recovery.

3.2.5.4 Sale and Bidding Methods, Due Diligence Requirements. For the preferred program, the Secretary has recommended that sale and bidding

method regulations be kept flexible, permitting the choice of method to be on a case-by-case basis.

Coal leases would usually be sold using the individual tract sale method in which bidders compete against one another for any given tract. The Department would choose which tracts it feels are the best tracts, both economically and environmentally, and which cumulatively contain the amount of coal reserves desired for lease. These tracts would be offered for sale over the four year period of the regional sale schedule. The highest bidder in any sale would be offered the tract provided his bid meets fair market value, passes the Attorney General's anti-trust review, and meets all other requirements of the laws and regulations.

Coal leases could also be sold using the intertract sale method in which bidders compete between tracts as well as over individual tracts. Competition would be enhanced because more tracts would be offered than are intended to be awarded. The high bids for each tract would be compared, and only those tracts with the highest bids above fair market value which are needed to meet cumulatively the sales's target would be awarded. As under individual tract bidding, the tracts for the sale offering would be selected on the basis of land use planning, site specific analysis, and tract ranking. The intertract sale method would be used at least in all cases where tracts are offered for sale which would be mined by surface mining methods and which involve non-transferable surface owner consents given before the enactment of SMCRA.

Regardless of whether the individual tract or intertract sale method is used, the type of bidding method must also be determined. Optional methods tentatively identified by the Department of Energy as acceptable include:

- Direct or deferred bonus bidding: cash payment is offered for the lease. (Note, the Federal Coal Leasing Amendments Act of 1976 requires half of all sales to be by deferred bonus bid.)
- Variable royalty bidding: bids are placed in the form of royalty rates based on a percentage of the value of the coal recovered (usually a small cash down payment is also required).
- Sliding scale royalty bidding: cash payment is offered for the lease, but the amount of the royalty paid is varied in proportion to the value of the coal produced.

In addition, DOE has stated it intends to study very closely possible use of a profit sharing method (British system). Here the government essentially becomes a partner in the coal enterprise and receives a bid offering a percentage of profits, if any.

The potential bidder in the lease sale will wish to know what diligence and continued operations requirements he will have to meet if he purchases the lease. The current regulations (43 CFR 3500.05), which have been carried over to the new proposed regulations, define diligent development for any coal lease issued after August 4, 1976, as the timely preparation for, and initiation of, coal production from a logical mining unit (LMU) of which the lease is a part so that the coal is actually produced at the rate of one percent of the reserves in the LMU by the end of the tenth year from the effective date of the lease. Diligent development for any lease issued prior to August 4, 1976, is defined as the timely preparation for, and initiation of, coal production from the LMU so that the coal is actually produced at the rate of one-fortieth of the LMU reserves before June 1, 1986. Under the regulations, the period of time for the latter leases may be extended.

Timely production of coal is further assured through the current "continued operation" regulations. Under these regulations, coal equal to one percent of the reserves of the logical mining unit must be produced for each of the first two years following achievement of diligent development. Thereafter, an average amount of one percent of the reserves associated with the lease must be produced. The average amount is computed over a three-year period consisting of the year in question and the preceding two years.

Although the authority to promulgate regulations concerning bidding methods, diligent development, and continued operations was transferred to the Department of Energy in the Department of Energy Organization Act, should DOE not promulgate new regulations before a Federal coal management program is established, the current regulations would remain in force until superseded by DOE regulations.

3.2.5.5 Consultation with the Governors. Prior to setting a regional coal lease sale schedule, the

Secretary would consult with the governor of each state in which tracts to be leased are located. The Secretary would ask each governor to comment in a specified period of time, not less than 30 days nor more than 60 days, before issuing the final schedule of sale. Section 3 of the Federal Coal Leasing Amendments Act of 1976 provides a specific procedure for consultation with a state when a lease proposal would permit surface mining within the boundaries of a National Forest within that state. The governor would be notified by the Secretary. If the governor fails to object to the lease proposal in 60 days, the Secretary could issue the lease. If, within the 60-day period, the governor notifies the Secretary, in writing, of an objection to the lease proposal, the Secretary would not approve the lease for six months from the date the governor objects to the lease. The governor could, during this six-month period, submit a written statement of the reasons why the lease should not be issued, and the Secretary would, on the basis of this statement, reconsider the lease proposal.

These pre-sale and sale procedures are compatible with all alternatives, although they would have no applicability to the no new leasing and preference right leasing only alternatives.

3.2.6 State, Local, And Industry Participation.

A variety of methods have been developed to provide state, local, and industry participation in the preferred alternative Federal coal management program.

3.2.6.1 State Participation. The preferred program is designed to offer as significant a role for the state governments in the Federal coal management process as possible short of providing them with veto power over Federal decisions. The states would be offered the opportunity to sign cooperative agreements to enable them to participate directly in the land use planning process. The States could nominate unsuitability criteria to be added to the list of Federal unsuitability criteria. They could also submit expressions of interest in potential coal tracts. The states would be expected to participate actively and directly through membership on regional coal teams in the activity planning procedures of tract ranking, selection, and scheduling . Furthermore, a special consultation step would be provided to the states in setting regional production goals and leasing targets. The governor would also be informally consulted prior to any final decision to offer a tract for sale. Although the states would be expected to provide their views over the full spectrum of issues, the Department would particularly need the states' comments on the interregional and cumulative regional social and economic impacts of coal development in the regional leasing target - setting process and on intraregional and site-specific social and economic impacts in the tract ranking and selection process. The states would also have the lead for many post-sale lease management actions.

Whenever possible, the regional coal teams (see Section 3.2.3.2) would serve as the general forums in which state participation would occur. In particular, as noted in Sections 3.2.3.2 and 3.2.4, these teams would be the focal points for developing proposals for Secretarial decision on the tracts selected and scheduled for sale and on regional production goals and leasing targets.

The activities of these teams would provide the state governors with an opportunity to discuss any potential significant Federal decisions *before* they are made and not just in the formal consultation which occurs after the decision-making and would provide to the citizens of each state, through their elected officials, an authoritative forum for the airing of their interests and concerns.

3.2.6.2 General Public Participation. The public would have several opportunities to participate directly throughout the coal management decision making process. Hearings would be held on the land use plan recommendations before the final land use plan decisions would be made. Comments would be solicited from the public at the beginning of the regional tract ranking, selection, and sale scheduling process. The public would have the opportunity to submit written comments and to participate in a hearing on the regional sale environmental impact statement. The Secretary could also hold additional hearings in the area of the proposed sale if there were a general interest in the proposed sale and any issue existed which had not been throughly discussed at previous hearings. Besides the general public participation steps, there would be opportunities for participation during the surface owner consultations, surface owner consent, and indications of leasing interest stages of the coal management program.

In addition to these formal opportunities for public participation, anyone could submit general comments at any time in the process. The Department would schedule meetings for public comment whenever it has reason to believe that it would serve the public's interest.

3.2.6.3 Industry Participation. Industry is a critically important actor in the preferred program not only because it supplies the bidders in the lease sales and the technology and capital to extract the coal, but also because it provides the information needed in the determinations leading to the delineation of tracts. The three principal sources for coal information in the United States are the Federal government, through the Geological Survey and other agencies; the state governments, through the state geological surveys or mining bureaus; and the coal industry. Industry is in a special position to make the Federal government aware of the type, quality, quantity, and location of coal which it believes should be considered for leasing.

Industry would be able to participate in the land use planning and regional production goal and leasing target setting processes through all the same formal and informal channels available to the general public. During land use planning, industry could contribute information on existing operations and on the location of resources. During the setting of regional production goals and leasing targets, industry could supply information on the overall demand for coal and the production potential from previously leased Federal reserves and non-Federal reserves for meeting that demand. In addition to these general participation opportunities, industry would continue to have the opportunity to indicate tracts it would like to see leased and supply site-specific data. Indeed, such industry indications are critical to the functioning of the leasing component of a Federal coal management program. In the preferred program, this step would be scheduled to occur as the first formal step in the activity planning process.

As previously noted, the activity planning process for coal would involve the delineation, ranking, and selection of tracts within areas identified as acceptable for further consideration for coal leasing in the land use plan. Information derived from industry data would be required to assist in determining need and to facilitate lease tract delineations and economic evaluations. To obtain these data, industry would be requested through formal notices to submit expressions of leasing interest for coal within the areas acceptable for further consideration for leasing set out in the land use plans. To the extent these indications define potential tracts, they would be relied on for the preliminary delineation of tracts, unless it is determined that different tracts or different tract boundaries would be necessary to ensure competitive interest in the eventual lease sale, conserve Federal coal, or meet other largely economic objectives in the coal management program. The types of information which might be requested and used in the tract delineation and ranking process would be:

- Written descriptions of land by legal subdivision and a map with a scale of one-half inch to the mile or larger.
- Amount of coal desired including such geologic data on the area as bed thickness, overburden depth, and thickness of coal seam(s).
- Method of mining anticipated, with proposed mining sequence and rate of production.
- Relationship, if any, between the anticipated mining operations and existing or planned mining operations or supporting facilities on adjacent Federal or non-Federal lands.
- Anticipated method(s) of transportation and status of existing or proposed transportation system.
- Evidence of qualifications.
- Intended "end use" of coal.
- Consent certification if the surface is not owned or controlled by the Federal government.
- Description of adjacent coal reserves under ownership or control of the company providing the expression of leasing interest.

These participation components would not be compatible with the no leasing or preference right leasing only alternatives and would be used only to a limited extent under the emergency leasing alternative. Under the lease to meet industry indications of need alternative, greater emphasis would be placed on obtaining, at an early stage,

industry nominations and less emphasis would be placed on state consultation. Under the state determination of leasing levels alternative, the role of the states would obviously be pre-eminent. On the other hand, in the lease to meet DOE production goals alternative, the roles of industry and the states would both be reduced.

3.2.7 Special Leasing Opportunities.

In response to the requirements in the Federal Coal Leasing Amendments Act of 1976 and the Small Business Act of 1953, as amended, the Department would reserve and offer a reasonable number of coal lease tracts as special leasing opportunities. The special opportunities would be provided through special lease sales where public bodies would bid only against other public bodies and small businesses only against other small businesses. No special determinations of maximum economic recovery or other possible financial incentives would be proposed.

Public bodies are non-profit consumer-owned utilities, principally rural electric cooperatives, municipally owned utilities, and Federal agencies. The Secretary would designate and schedule one or more coal lease tracts for special opportunity lease sales for public bodies after the ranking and selection process only if a public body has, through submission of an expression of leasing interest, requested that a special opportunity lease sale be held. With the of submission of this request, the public body would have to provide evidence of its qualifications to participate in a special opportunity sale.

Small business would be required to meet the qualifying standards set forth in 13 CFR 121. The Small Business Administration proposed qualification requirements for small businesses to participate in Federal coal lease special opportunity sales on March 14, 1979 (44 Federal Register 15513-15514). To qualify, the business would have to be independently owned and operated, not be dominant in its field, and, together with its affiliates, employ not more than 250 employees. Although it would be advisable and to its advantage to do so, a small business would not be required to notify the Department of its desire for a special opportunity sale. The Secretary's decision to hold a small business special opportunity sale would be made in consultation with the Small Business Administration.

The Department has under consideration various methods of encouraging minority business participation in the Federal coal management program. This could be accomplished administratively or through legislation and by means of a separate set-aside sale or through the assistance of the Small Business Administration in the small business set-aside sales.

These special leasing opportunity procedures would be employed in all but the no leasing and preference right leasing only alternatives.

3.2.8 Emergency Leasing System.

The preferred program would contain an emergency leasing system which would enable the Department to provide for urgent needs for Federal coal when those needs could not be met in a timely manner through the general, long-term leasing process (by pass, production maintenance, or hardship situations). The emergency leasing system would differ from the general, long-term leasing process only with respect to (1) the method of tract identification and (2) the breadth and scope required in the planning and environmental assessment process. This system would be administered tightly, so as to maintain the integrity of the general, long-term leasing process.

To qualify for production maintenance or bypass emergency leases, an operation that has been producing for at least two years prior to the application would be required to show that:

- The Federal coal is needed within three years to maintain an existing mining operation at the average annual level of production or new contracted level of production on the date of application, as substantiated by the proposed production levels stated in a mine plan or a complete copy of the supply or delivery contract, or both; or
- If the coal deposits are not leased they will be bypassed for the reasonably foreseeable future, and if leased, some portion of the tract applied for will be utilized within three years, as substantiated by the proposed production levels stated in a mining sequence plan; and
- The need for the coal deposits resulted from circumstances that were beyond the control of the applicant or for which he could not have reasonably foreseen and planned.

The extent of coal reserves covered by bypass and production maintenance emergency leases could not be more than that which could be mined over eight years at the average annual production level or new contracted level of production on the date of the application.

An applicant not qualifying for an emergency lease under the above conditions could still qualify as a hardship case if his operations are:

- Outside of a coal region;
- Inside a coal region in which activity planning has not yet begun; or
- Of a size, quality, or end use that is not significantly related to meeting the regional leasing target.

The applicant would also be required to show a hardship of the following type:

- A locality has lost or will lose its alternative sources of domestic coal supply;
- A mine which has been closed will be reopened, and local unemployment will be aleviated;
- The mine will test new technology supported by a Federal agency;
- Mining and reclamation of the tract will promote a program or policy of another surface management agency, such as rehabilitation of lands scarred by past uses; or
- Similiar reasons that the Secretary, after holding a hearing, determines are substantially in the public interest.

The terms of hardship emergency leases would be determined on a case-by-case basis.

The tract to be offered for the emergency lease sale would only be so much of the land applied for as would be necessary to meet the emergency need of the applicant without violating the integrity of the general, long-term leasing process.

No coal lease would be issued unless a comprehensive land use analysis has been conducted on, and the Department's unsuitability criteria have been applied to, the land to be included in the lease. All emergency leasing decisions would have to be consistent with the appropriate land use plan or analysis and the unsuitability criteria.

Before a lease sale would be held in response to an emergency lease sale application, an environmental analysis would be completed on the potential effect of such a coal lease on the resources of the area and its environment, including fish and other aquatic resources, wildlife habitats and populations, and visual, recreation, cultural, and other resources in the affected area. Should the Department determine an environmental impact statement is required, one would be completed.

The pre-sale and sale procedures, including public participation procedures, of the general, long-term leasing process would be followed in all emergency leasing situations.

This would be the major component of the emergency leasing alternative. It could also remain a component of the lease to meet DOE production goals, lease to meet industry indications of need, and state determination of leasing level alternatives.

3.2.9 Post-Programmatic Environmental Analysis

The National Environmental Policy Act of 1969 requires each Federal agency proposing a major action which might significantly affect the quality of the human environment to prepare a statement of the environmental impacts of that action and its reasonable alternatives. The Department, in formulating the preferred coal management program, considered which key leasing decision points could represent major Federal actions within the meaning of the Act.

The preferred option is to maintain two separate levels of environmental impacts analysis, one to consider interregional and national impacts and one to consider site-specific and cumulative intraregional impacts. The first level of analysis would be contained in this programmatic environmental impact statement, updated when necessary, and the second level of analysis would be made in environmental impact statements for each region covering the four-year sales periods and discussing the tract delineation, ranking, and selection process. These environmental analyses procedures in the preferred program are discussed in greater detail in section 3.1.1.7 and set forth in Section 3420.3-4 and 3420.4-5 of the proposed coal management regulations in Appendix A.

3.2.10 Administration of Existing Leases and PRLAs

A significant element of the Department's federal coal management program is the administration of existing coal leases and preference right lease applications. The amount of coal involved is

considerable. As of October 1978, there were 533 federal coal leases estimated to contain 17 billion tons of coal and 172 preference excluding Alaska right lease applications which cover land estimated to contain 9.9 billion tons of coal.

Because the United States owns a large percentage of coal in the United States (nearly 60 percent in the West) and because demand for coal is expected to increase significantly, Federal policies toward coal and, specifically, toward existing leases and preference right lease applications will have a significant impact on energy production in the United States. In 1977, 50 million tons of coal were produced from existing leases. The Department calculates, however, from data chiefly supplied by lessees themselves, that they are likely to produce 360 million tons annually from Federal leases by 1985. The Department uses this data in setting the regional leasing targets for coal leasing, taking into account environmental, social, and economic impacts in each region. The following discussion of issues summarizes the matters set forth in depth in the memorandum of March 20, 1979, from the Director, Office of Coal Leasing, Planning and Coordination to the Under Secretary (Appendix I in this statement).

The proposed coal management program is the major program for conducting the Federal lands review to identify lands unsuitable for coal mining pursuant to Section 522(b) of the Surface Mining Control and Reclamation Act, 30 U.S.C. 1272. There are 24 criteria set forth in Table 3-3 and Section 3461.2 of the proposed regulations (Appendix A) which may result in the assessment or designation of certain lands as being unsuitable for mining.

There are, however, certain limitations on assessing or designating lands involving existing leases or preference right lease applications as unsuitable for coal mining. First, under many criteria even if the criterion were otherwise applicable, if mining operations were being conducted on an existing lease on August 4, 1977, the lands are exempt from the criterion. Second, if substantial financial and legal commitments had been made to a mining operation before January 4, 1977, those lands are also exempt. Finally, under other criteria any unsuitability designation may not prejudice valid existing rights. The memorandum of March 20, 1979 (Appendix I) discusses the issues arising out of the exemptions from the application of unsuitability criteria to existing leases and preference right lease applications. Table 3-4 in this environmental impact statement, which is taken from the memorandum, sets out in detail the sources of authority for each criterion and the exemptions attached to its application.

The process of applying these criteria is also significant. The Director of the Bureau of Land Management has instructed Bureau offices how to incorporate the criteria into existing and future land use plans. Essentially, the 24 criteria will be applied to all coal lands. Lands in existing leases and preference right applications will be checked for exceptions (that is, any possible alternative mining method which is not unsuitable in the particular area, or any method of mitigating the adverse impact) and exemptions (that is, where the substantial commitments and valid existing rights provisions of SMCRA prohibit application of specific criteria.) All of the studies conducted for unsuitability will include public hearings before final assessments are adopted as part of a land use plan or environmental analysis on a mine plan.

The possibility of exchanging coal lands and leases to shift the impacts of operations from unacceptable to acceptable lands has always interested the makers of Federal coal development policy. One complex of issues discussed at length in Appendix I is the Secretary's authority to exchange coal leases or lease interests, and the Secretary's policies toward implementing that authority to prevent or mitigate unacceptable adverse social or environmental impacts of coal mining. Two propositions stand out from the discussion in Appendix I. First, the Secretary's authority to exchange coal leases is quite limited. Second, the Secretary, consistent with the Department's stance on S. 3189 in the 95th Congress, does not currently intend to consummate exchanges in cases where the unsuitability criteria or other provisions of the Surface Mining Control and Reclamation Act, or other Federal law, lawfully apply to prevent or adequately mitigate the threatened adverse impacts.

The first proposition can be quickly documented. To start with, what authority the Secretary does have is entirely voluntary; both the Secretary and the lessee or preference right lease applicant must be satisfied by the terms of the exchange. The Secretary does not have condemnation authority,

nor does he have purchase authority even if a lessee were willing to relinquish a lease for value. Prior to the Federal Coal Leasing Amendments Act of 1976, the Secretary did have the authority to exchange coal leases, but that Act repealed that authority. The Congress reestablished such authority in Section 510(b)(5) of the Surface Mining Control and Reclamation Act, 30 U.S.C. 1260(b)(5), only for a limited class of holders of coal leases in alluvial valley floors. In addition, the Department has provided by regulation, under its general authority in the Mineral Leasing Act, that, in exchange for voluntary relinquishment of a coal lease, a lessee may receive 1) a lease for certain minerals other than coal, (2) bidding rights to future coal leases, or 3) additions to other existing coal leases. The Department is not now seeking to broaden its authorities in this area, but it does appear that eventually the Department may reconsider asking Congress for new, broader, or more clarified coal exchange authority.

The second proposition above, that exchanges should not be consummated where mining operations on lands in the lease or preference right lease application can be lawfully prevented or adequately mitigated, states present Departmental policy. That policy is derived from three principles discussed at greater length in Appendix I. First, the existing exchange authority should not be exercised for the purpose of relieving lessees of their diligent development obligations under the lease. If a lessee has violated the diligent development requirements or appears not to have made any effort toward development, the lease should expire under its own terms or be cancelled rather than be exchanged. Second, exchanges should not be used to undermine the proper implementation of the environmental and reclamation standards newly established by and under the Surface Mining Control and Reclamation Act. If unsuitability criteria derived from Section 522(a) of that Act or from the statutory mining prohibitions in Section 522(e) of that Act can lawfully prevent the mining of a certain area or prevent mining an area in a certain manner, then the would-be exchange proponent has no property right to mine that area or to mine it in a certain manner that required recognition or "compensation" through an exchange. Third, if mining an area can lawfully be prevented, then there must be deducted from the value of the lease that includes that area for purposes of an exchange any value that would have been attributed to the unsuitable or otherwise unmineable acreage. If the Department used the value of the coal the lessee could *not* mine in finding a tract of equal value to lease in exchange, the Department might be giving something for nothing; coal with little or no economic value for coal with substantial economic value. These three points are all important in understanding that the exchange concept may not be easily converted into a viable management tool, and that the Department may have to seek Congressional clarification or resolution of these issues before exchanges become a significant component of the Federal coal management program.

The Department intends vigorously to enforce the diligence provisions, the provisions requiring diligent development and continued operation, applicable to existing coal leases. Such an effort will be a major impetus toward the timely development of the federal coal reserves already under lease. Under the regulations promulgated in May 1976 that apply to existing leases, production is to begin by June 1, 1986 or ten years after lease issuance, whichever is later. In order to be ready for that date, and in order to have firm diligence enforcement policies for the interim, the Department is examining a series of questions on this subject to determine (1) whether there are any enforcement actions that could or should be taken prior to 1986 for violations of any lease terms related to diligence, and (2) whether there are any limitations in the Mineral Leasing Act or the existing leases themselves that might in any way limit the complete application of the May 1976 regulations and their June 1, 1986, production requirement to all existing leases.

The Federal Coal Leasing Amendments Act of 1976 (FCLAA) generally applies only to leases issued after August 4, 1976. The diligence standards for new leases in the FCLAA are in many ways derived from the Department's own regulations on diligence which were published in May 1976, so the Department's December 1976 regulations to implement the FCLAA contain many parallel requirements for leases issued after the FCLAA was passed on August 4, 1976. Each lease is by regulation automatically a logical mining unit LMU. Production in commercial quantities (2.5 percent of the reserves for pre-FCLAA leases, one percent of the reserves for post-FCLAA leases)

must be achieved by the tenth lease year. The lessee must also continue operations at the rate of one percent of the reserves per year. Finally, upon application by the lessee, the Department may consider private lands or separate Federal leases to be part of a logical mining unit. Extensions in the period for achieving production or suspensions of the continued operation obligation of leases can be ordered by the Secretary to accommodate events not within the control of the lessee, including strikes.

All existing leases are also subject to readjustment every 20 years after their issuance. In addition to expressly imposing due diligence requirements at the time of readjustment, the Department will also raise royalties to at least 12.5 percent for coal mined by surface methods and eight percent for coal mined by underground methods. Current rates are as low as 5¢ per ton with the rates of 10¢ to 15¢ per ton being fairly common. Prior to the enactment of the FCLAA, 51 leases had had their 20-year anniversary, but had not yet been readjusted. More leases are now subject to readjustment, and the Department is now aggressively moving to readjust those leases to bring them into conformity with its May 1976 regulations and the FCLAA. On March 16, 1979, the Under Secretary endorsed the policy of systematically readjusting leases which are now pending readjustment or will become due for readjustment prior to June 1, 1979, to the prescribed minimum royalties, rather than attempting to establish possibly higher royalties on a case-by-case basis. This policy was adopted in order to complete the backlog of readjustments promptly.

The sale and sublease of existing leases presents a potential opportunity for the Department to impose the policies and requirements discussed above on existing leases. Up to this point, proposed assignments have been examined only to check the assignee's qualifications to hold the lease or to determine whether the assignor had been fully complying with the terms of the lease. Partially in response to assertions that there is an undesirable speculative market in the resale of coal leases, the Department is examining whether, in exercising its authority to approve assignments, the lease may be readjusted by the express imposition of due diligence requirements, consent to a plan of development, or other stipulations. A further question is whether the proposed lease assignment should be referred to the Attorney General for antitrust review.

Another important set of questions with regard to existing leases concerns the strategy to pursue in performing environmental studies. After the Department completed its programmatic environmental statement on the Energy Minerals Activity Recommendation System in 1975, it divided Federal coal areas into eight regions for the purpose of preparing environmental impact statements. Each regional statement was designed to study the site-specific impact of both operations on existing leases and new leases, in the framework of an analysis of the regional, cumulative impacts of the specific proposals. As a result of the decision in *NRDC v. Hughes* , 437 F. Supp. 981 (D.D.C. 1977), *modified* , 454 F. Supp. 148 (D.D.C. 1978), *appeal pending* , the Department stopped considering possible new leasing, and continued specific study only of the 27 mine plan approval and other coal-related applications then pending. The Department is now studying all possible options on a regional level, including a no new leasing alternative. If no new leasing is found to be necessary, the Department will then consider site-specific mine plans for existing leases. These studies would be keyed into the completed regional environmental statements. If new leasing is found to be necessary, the Secretary's preferred alternative is to establish the need for leasing region by region, and then proceed to study and rank tracts within each affected region. While specific new environmental studies would have to be prepared for approval of mine plans for existing leases, specific environmental studies for new leases will be performed as part of the regional tract delineation, ranking, and selection, and sale scheduling processes.

Most of the program requirements and policy issues just discussed apply to both existing leases and preference right lease applications. However, a few additional points should be made with respect to preference right lease applications. In determining whether a preference right lease applicant has discovered coal in commercial quantities and is thus entitled to a lease, the Department must take into account quantifiable environmental costs and must consider what stipulations should be imposed to mitigate environmental damage. (See *Natural Resources Defense Council, Inc. v. Berklund* , 458 F. Supp. 925 (D.D.C. 1978), *appeal pending* .) While a preference right lease applicant has a valid existing

right to have his lease application adjudicated even though the law has changed, he does not necessarily have a valid existing right to mine, as the term is used in applying unsuitability criteria. It is, rather, the right to have his application fairly acted upon by the Department. In addition to considering the provisions of the National Environmental Policy Act, the Department must, when adjudicating an application, also consider the provisions of the Surface Mining Control and Reclamation Act and the Federal Coal Leasing Amendments Act of 1976.

The Department has the same authority, and the same problems, with exchanges involving preference right lease applications as it does with existing leases, with one added twist. Does the Secretary have to make the crucial determination of discovery of commercial quantities of coal before he can make an exchange? If the applicant is found to be entitled to the lease, he may have no incentive to complete the exchange. If the determination is not made, the Secretary risks exchanging something of value for nothing. A task force in the Office of the Assistant Secretary, Land and Water Resources, has been formed to consider this and other issues related to exchanges.

Another likely problem occurs because coal prospecting permits could be issued only on lands which are unclaimed and undeveloped. Some study has been done by the Bureau of Land Management indicating that the land in some of the preference right lease applications is covered by mining locations. Thus, these conflicts will have to be eliminated; the procedures for the resolution of these conflicts have yet to be fully defined.

Another issue in the adjudication of the pending applications concerns the proper royalty rate to be charged on leases issued to preference right lease applicants. Section 7 of the Mineral Leasing Act, *as amended* , 30 U.S.C. § 207 (1976), sets a minimum royalty, but not a maximum. Thus, the royalty rate can apparently be varied to capture the fair market value of the coal, and prevent a lessee from garnering undue profits. At the same time, however, the royalty rate in many private leases that can only be developed in conjunction with Federal lands is tied to that of the adjoining Federal leases. Therefore, a boost in the Federal rate may well boost the private rate on significant quantities of coal.

Finally, the due diligence requirements of the December 1976 regulations implementing the Federal Coal Leasing Amendments Act of 1976 will be imposed on every new lease issued to preference right applicants. While the preference right applicant may have the right to a lease, he is not entitled to any particular terms that he may specify, but rather those required by law and policy in effect at the time of lease adjudication and issuance.

Appendix I to this environmental impact statement discusses these issues in depth. As that Appendix and this summary make clear, the administration of existing leases and preference right lease applications will require a significant share of the Department's coal management efforts. While the discussion in Appendix I can serve in part as a guide in the administration of certain matters, especially application of the unsuitability criteria, the rest of that Appendix sets out the significant legal and policy issues which the Department will have to resolve before routine administration of existing leases and PRLAs is realized and before the Department can predict with full confidence future production from existing leases and PRLAs without relying primarily on lessees' intentions.

3.2.11 Special Start-up Considerations

The preferred program, if adopted, would be a major effort for the Department. The administrative tasks would begin with pre-planning inventory efforts and proceed all the way through post-mining land use monitoring. The program would touch on a myriad of other Federal and state programs with a degree of interrelationship varying from slight to mutual dependence. To put such a program in place without causing severe disruptions either to the management of Federal coal resources or to other important programs requires careful and prudent planning. This section presents the major considerations that will control the start-up of the Federal coal management program if the preferred program is selected. Assuming that, upon review of this statement, the Secretary, first, decides that a new Federal coal management program is needed; second, selects a program substanatially similar to the preferred program described in this statement; and third, determines that lease sales should be held in one or more regions during 1980 or 1981, the new program

would be established and integrated into existing programs, most notably the land use planning process, as follows:

- Much of the general resource inventory and land use planning required under the procedures described above would be adopted from work already completed or work that is underway at the time of the publication of this final environmental impact statement.
- In all areas for which plans have never been prepared, the inventory process, the first step in land use planning, would begin under the normal scheduling for BLM. It is estimated that about 15 percent of the coal areas are in this class. The proposed BLM planning regulations would be applied to these areas. Planning areas would be selected for inventorying based on the anticipated need for the leasing of coal in the particular areas or on other high resource demands.
- In certain priority areas for which land use plans have been completed, the land use decisions would be reexamined on areas identified in the existing plans as appropriate for coal development. This reexamination would be in the form of application to these areas of the unsuitability criteria that are selected by the Secretary as a result of his decisions on the program. Also, if surface owner consultation had not taken place earlier, this step would be taken. Those areas which remain acceptable for further consideration for leasing after application of the criteria and consultation with qualified surface owners would, following opportunity for public comment, be identified in a published supplement to the existing plan. These areas would then be entered in the activity planning process and could be considered for lease sale. A call for industry expressions of leasing interest in the areas identified in the supplement as acceptable for further consideration for leasing would be the first step taken in activity planning after publication of the supplement.
- As discussed in Sections 3.2.2 and 5.4.10. the Department would use land use plans supplemented as necessary until new plans could be prepared under proposed BLM regulations (43 Federal Register 58764-58774).
- The first lease sales may not be conducted in all regions for which the regional leasing targets suggest leasing is needed and might be insufficient to fully meet the targets for the regions in which they are held.
- Notice of intent to rank tracts would be issued immediately prior to initiation of ranking.
- The first regional lease sale environmental impact statements would likely address a two-year rather than a four-year lease sale schedule.
- The regional targets, if any, for the first sales would be selected by the Secretary after reviewing all the comments received as a result of the publication of this statement and after consulting with the state governors and with the Secretary of the Department of Energy.

The Department anticipates that, should the Secretary elect to start up the preferred program as quickly as possible, a lease sale schedule would be prepared for 1980-1981 under these start-up considerations. Subsequent schedules would be prepared substantially as set out in the preferred program. However, land use plans prepared wholly under the proposed BLM planning regulations would not begin to appear in the process until 1984 or 1985. It might be several more years before a sufficient number of new land use plans are prepared to identify enough areas acceptable for further consideration for leasing to permit coal leasing decisions to be based entirely on land use plans which fully conform with the proposed planning regulations.

3.2.12 Other Aspects of the Preferred Program

Two other aspects of the preferred program considered by the Secretary were maximum economic recovery and end use controls.

3.2.12.1 Maximum Economic Recovery. In Section 3 of the Federal Coal leasing Amendments Act of 1976 (FCLAA), the Congress introduced the concept of Maximum Economic Recovery (MER). The Congress has indicated that MER is of considerable importance and should be treated in a consistent and formal manner. The statute requires MER to be considered at two stages - - lease issuance and mine plan approval. Specifical-

ly, Section 3 of FCLAA, requires that: "Prior to issuance of a lease, the Secretary shall evaluate and compare the effects of recovering coal by deep mining, by surface mining, and by any other method to determine which method or methods or sequence of methods achieves the maximum economic recovery of the coal within the proposed leasing tract. This evaluation and comparison by the Secretary shall be in writing but shall not prohibit the issuance of a lease; however, no mining operating plan shall be approved which is not found to achieve the maximum economic recovery of the coal within the tract."

The issue forwarded for the Secretary's expression of preference was what definition of MER should be adopted. Five different definitions were considered; the Secretary prefers that MER be calculated so as to require that all coal seams which are collectively profitable be mined, taking into consideration social and environmental costs. For any scale of development (annual production rate), this definition would tend to minimize the area disturbed from surface mining; deeper seams would be substituted for the broadening of areas of operation.

An interagency task force is presently devising the methods for determining MER in accordance with the Secretary's preference and at least two other alternatives. At the request of the Council of Economic Advisers, the task force will conduct an economic analysis of the Secretary's preference and other alternatives to determine their cost of administration and their effects on individual lessees and the overall coal market.

3.2.12.2 End-Use Considerations. Another issue considered by the Secretary was whether the Department should condition new coal leases with stipulations which specify how, where, or by whom coal would be consumed. The goals of such restrictions would be to:

- More actively control the location and extent of environmental degradation.
- Promote the entry of economically and socially disadvantaged groups to the coal industry.
- Allow more active integration of Federal actions with state and local government planning, and otherwise control socioeconomic impacts.
- Encourage new energy technologies.

Coal leases have not in the past limited how lessees could dispose of mined coal. A lessee can sell the coal for a minemouth power plant, ship coal short or long distances, or use the coal for gasification. Specifying the end-use of coal from new leases could give the Department greater control over the environmental and economic effects of mining and could be used to encourage new technologies. There is, however, a very real possibility end use conditions could infringe upon other agencies' responsibilities, such as state regulation of power plant siting and the Environmental Protection Agency's Clean Air Act regulations. In addition, the Department's legal authority to regulate end-uses is unclear.

Options for resolution of this issue ranged from not adopting end-use stipulations (except as mandated in the FCLAA for public bodies and as required for railroads in the Mineral Leasing Act of 1920) to an active policy of conditioning leases to meet all the goals specified above. The Secretary preferred not to adopt end-use stipulations pending a Solicitor's opinion on the Department's authority for such action. The Solicitor's opinion is being developed.

3.3 REFERENCES

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2. U.S. Department of the Interior, 1978. Land Unsuitability Criteria, Office of Coal Leasing, Planning, and Coordination, Washington, D.C.

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CHAPTER 4

DESCRIPTION OF REGIONAL ENVIRONMENTS

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CHAPTER 4

DESCRIPTION OF REGIONAL ENVIRONMENTS

This chapter contains descriptive discussions of the environments of the twelve coal regions specified in Chapter 1 (see Figure 1-1). The components of each region are discussed cumulatively due to their physical continuity and their similar environments. Each regional description is subdivided into a discussion of the environment and a discussion of the environment and man. The sections on the environment contain descriptive information on the regions' topography, geology, resources, climate, air quality, water quality, and biota. Supportive ecological descriptive data are contained in Appendices D and E. The sections on the environment and man contain descriptive information on history, resource development, economics, infrastructure, and demography. The descriptions are limited to only those environmental features which are pertinent to the environmental impact analyses described in Chapter 5. For a list of counties that are contained either totally or partially within each region's respective boundaries, refer to Appendix J.

4.1 THE APPALACHIAN COAL REGION

The Appalachian Coal Region is in the Appalachian Mountain range of the eastern United States. The region encompasses 111,637 square miles in two Maryland, 31 Ohio, 49 West Virginia, 32 Pennsylvania, 34 Kentucky, 21 Tennessee, seven Virginia, 24 Alabama, and four Georgia counties. For purposes of discussion, this region has been divided into three regions: the Northern Appalachian, Central Appalachian, and Southern Appalachian Coal Regions. The Northern Appalachian Coal Region covers 53,120 square miles in 94 counties of Pennsylvania, Ohio, West Virginia, and Maryland. The Central Appalachian Coal Region covers 35,292 square miles in 69 counties of West Virginia, Kentucky, Tennessee, and Virginia. The Southern Appalachian Coal Region covers 23,225 square miles in 39 counties of Tennessee, Georgia, and Alabama.

4.1.1 The Environment

The dominant topographical feature of the region, the Appalachian Mountain Range, reaches elevations of up to 5,000 feet in the Central Region. Elevations in the Northern and Southern Regions are much lower, although large changes in relief do exist. The steepsided plateaus of sandstone bedrock on the eastern side of the range give way to broad open folds dipping gently to the west.

This difference in the topography of the eastern and western sides of the Appalachians reflects the two different physiographic provinces involved. The Valley and Ridge Province to the east consists of rocks that have been greatly disturbed by faulting and folding. The Appalachian Plateaus to the west have not been subject to such severe disturbance and the gently folded rocks are nearly flat. Unique or significant geologic features, such as caverns and karst areas, are numerous.

Sandstones, shales, limestones, conglomerates, and beds of coal are characteristic of the three Appalachian Coal Regions. Coal-bearing rocks are of Pennsylvanian age and include the Monongahela, Conemaugh, Allegheny, and Pottsville Formations. The total estimated coal reserve base for the entire Appalachian Coal Region is 103 billion tons.

The rank of coal in the Appalachian Coal Region varies with physiographic provinces, reflecting the differing amounts of deformation the rocks received. The coal in the Appalachian Plateaus (on the western edge) is high-volatile bituminous, with some coal being as high in grade as anthracite.

In general, the Appalachian Coal Region has moderate to hot, humid summers and moderate to cold, humid winters with an average annual precipitation of 40-50 inches. Growing seasons (periods of frost-free temperatures) vary from 120 to 210 days. The mean annual relative humidity is about 70 percent. The most distinctive climatic difference between the subregions is the monthly distribution of precipitation.

The Northern Appalachian Coal Region has coldest temperatures; the average annual temperatures are 54°F, with minimum January temperatures of 20°F and maximum July temperatures of over 70°F. Summer is the season of maximum precipitation. Light wind speeds are common, with an average of 9.5 miles per hour (mph) at ridge level and 6 mph in the valleys.

The Central Appalachian Coal Region has a more moderate climate with mild, damp winters and hot, humid summers. The mean annual temperature is 57°F. The annual precipitation is 45-50 inches, though some sheltered valleys receive less than 40 inches and higher elevations in some areas of Tennessee receive over 55 inches. The Central Appalachian Coal Region has two seasons of maximum rainfall, spring and summer; fall brings the least precipitation. The winds are similar to those in the Northern Appalachian Coal Region: 8-9 mph on the ridges, 50-60 percent less in the valleys.

The Southern Appalachian Coal Region has mild, wet winters and hot, humid summers. The annual mean temperature reaches 65°F, while precipitation averages 54 inches annually. The maximum precipitation is received in late winter and early spring. Fall has the least rainfall.

In none of the regions do extremes in meteorological conditions occur often enough to restrict habitation, land use, or physical resource development. Seasonal flooding along river, stream, and creek banks, occasional hurricanes in the southern areas and more rarely in the northern areas, severe winter storms ("northeasters" in the Northern Appalachian Coal Region), and infrequent droughts or tornadoes may have temporary local adverse effects on land use.

Land use, however, can affect local climates. Large quantities of heat and moisture or disruption of surface features can alter temperatures and moisture conditions, and thus affect local growing seasons. Major surface disturbance can also lead to loss of ground cover (which provides shade and soil stability), which could result in changes in relative humidity, soil temperature, soil moisture, and susceptibility to flash flooding. Solid particulates in the air can weaken intensity of solar insulation, while sulfur dioxide in the air can lead to acid rain which will corrode limestone, marble, etc.

Various meteorological parameters, such as speed, persistence, and direction of winds, can affect the significance of the negative impacts of land uses on air quality. Frequency and persistence of atmospheric inversions can be considered a limiting factor to pollution-creating land uses in the Appalachian Coal Region. In the Northern Appalachian Coal Region, surface-based inversions occur 35-45 percent of the time in winter and up to 70 percent of summer mornings. Poor dispersion also occurs frequently in late summer and fall in the other regions. This creates a high potential for stagnation of poor quality air throughout the region, particularly in the summer.

This combination of particular types of land use and climatic conditions had obvious effects on air quality in some parts of the Appalachian Coal Region. In heavily industrialized and mined areas in Pennsylvania, Ohio, and West Virginia, such as the Steubenville-Weirton-Wheeling Interstate Air Quality Control Region (AQCR), the national primary ambient air quality standards for sulfur dioxide and suspended particulate matter are not being attained. In most other counties and AQCRs in the Appalachian Coal Region, however, the air quality is good. In Maryland, Virginia, Kentucky, Tennessee, Georgia, and Alabama, measurements of sulfur dioxide and suspended particulate matter are generally better than the national standards.

Unlike most of the other regions to be discussed in this statement, the Appalachian Coal Region has an abundant supply of surface water. Severe droughts are uncommon and, in fact, many areas are flood prone. The Ohio River and its tributaries are major streams in the Northern Appalachian Coal Region, and the average annual stream flow from the Upper Ohio River Basin (as measured at Sewickley, Pennsylvania) is 23.3 million acre-feet. In the Central Appalachian Coal Region, the Big Sandy and Kanawha Rivers provide the upper Ohio and upper Tennessee River systems with the most abundant surface water flow of the three regions — 49.7 million acre-feet.

Use of surface water is constant throughout the year in all the regions, with industry and municipal entities being the dominant consumers. Annually, 1.3 million acre-feet is used in the Northern Appalachian Coal Region, 1.5 million in the Central Appalachian Coal Region, and only 23,000 in the Southern Appalachian Coal Region. Agricultural use of surface water is unimportant.

Topography has an important influence on both quantity of runoff and quality of surface water. Runoff is higher in the steep areas of the Valley and Ridge Province to the east than in the more gently sloping Appalachian Plateaus in the west. Likewise, sediment load and total dissolved solid content are greater in the eastern areas than in the western ones. Average sediment load ranges from 250-280 milligrams per liter in the western areas, and can jump to 2500 mg/liter in high runoff areas on the eastern rim. Likewise, total dissolved solids can vary from 100-350 mg/liter in the west to over 1200 mg/liter in small areas of the east. Surface water quality is also significantly influenced by land uses. Many of the nation's acid-mine drainage pollution problems are in the Northern Appalachian Coal Region. Other industrial and municipal wastes also plague surface water quality throughout the region.

Groundwater in the Appalachian Coal Region is most prevalent in some carbonate rocks, sandstones, and shoestring deposits of sand and gravel occupying flood plains along the principal streams. Well yields range from only a few gallons per minute to 500 gal/min., depending on the permeability of the rock. Groundwater quality is generally poor in the Appalachian Coal Region, with hardness and local excesses of iron, manganese, and hydrogen sulfide being the primary problems. Mining, industrial, and municipal wastes cause local adverse effects on groundwater quality.

Due to an abundance of surface water in the Appalachian Coal Region, groundwater does not play as significant a role in the survival of man, plants, and animals as it does in much of the West. Groundwater use is relatively low with a high of 190,000 acre-feet per year in the Central Appalachian Coal Region and a low of 11,500 acre-feet in the Southern Appalachian Coal Region.

Geology, topography, and climate are important factors in determining soil type. Generally, the soils in the Appalachian Coal Region are a mix with weakly differentiated horizons that exhibit the alteration of various parent materials. Soils are low in organic matter with subsurface horizons of clay accumulations. Most of the soils in the Appalachian Coal Region are well-drained with low natural fertility. Moderate to severe erosion hazard is common.

There are two major native vegetation communities in the Appalachian Coal Region, the eastern deciduous forest (primarily in the Northern and Central Appalachian Coal Regions) and the southeastern mixed forest (Southern Appalachian Coal Region). The wide variety of forest and understory vegetation, good interspersion of terrestrial and aquatic habitat types, and the abundance of water resources give the region the cover, water, space, and forage needed to accommodate a multitude of wildlife species. Over 300 species of fish, 96 species of reptiles and amphibians, 110 species of birds, and 200 species of mammals, as well as innumerable invertebrates, inhabit the region on either a permanent or seasonal basis. It is impractical to identify all the plant and animal species in the subregions so only some of the major or characteristic species will be noted.

In the Northern and Central Appalachian Coal Regions (from Ohio and Pennsylvania south to West Virginia and Kentucky, and along lower slopes of mountains extending into the Southern Appalachian Coal Regions), beech and maple are the predominant species. Closely associated oaks, sweetgum, tulip, hornbean, basswood, wild cherry, dogwood, hedge maple, hawthorne, and alder are also present. From Tennessee south into the Southern Appalachian Coal Region, the character of the eastern deciduous forest changes somewhat, with oak becoming the dominant species. Tulip, sweetgum, and shagbark hickory are common. Typical animal species in these areas of the deciduous forest include such game and furbearing species as the whitetail deer, black bear, wild turkey, eastern cottontail, raccoon, opossum, gray squirrel, and gray and red fox, and such birds as woodpeckers, thrushes, warblers, vireos, and owls.

The Southern Appalachian Coal Region contains some immature sandy soils overlain by pine forests. Lobolly, shortleaf, pitch, Virginia, longleaf, and slash pines are the most widespread varieties. Typical animals in these forests include such game species as black bear, whitetail deer, and ruffed grouse, and such birds as nuthatches, chickadees, woodpeckers, and warblers.

Aquatic and riparian vegetation throughout the Appalachian Coal Region includes such species as loosestrife, arrow arum, pondweed, water lilies, plaintains, and cattails. The rivers, streams, and lakes in the region support many aquatic insects and mollusks, as well as game fish such as bass, trout, crappie, bluegill, pike, pickerel, muskellunge, and catfish, and non-game fish such

as carp, shad, shiners, chubs, and sculpins. These same water sources and the riparian habitat near them accommodate turtles, lizards, muskrat, otter, beaver, and many species of snakes, frogs, and salamanders.

Agricultural crops are varied and numerous in the region. The animal species which prefer agricultural land habitat and can live in relatively close association with man are whitetail deer, robin, crows, mourning dove, bobwhite, red fox, raccoon, hawks, and owls.

Currently, there are at least 26 species of animals within the Appalachian Coal Region that are listed as endangered under the Endangered Species Act of 1973. These include the bald eagle, peregrine falcon, Bachman's warbler, red-cockaded woodpecker, eastern cougar, gray bat, Indiana bat, watercress darter, and 17 species of mussels. Although there are no Federally listed threatened or endangered plants within the region, there are a large number proposed for listing. These are presently under consideration by the U.S. Fish and Wildlife Service.

There are numerous local variations (due to topography, soil, and climate) in vegetation and wildlife that will require site-specific assessments to identify exact distributions of vegetative species. In the coal basin region of Alabama, the uplands plantlife is dominated by Virginia, shortleaf, longleaf, and loblolly pines; turkey and red oak; sweetgum; and winged elm, because they are tolerant of shallow, dry, nutrient-poor soils. Lower slopes, however, are occupied by larger, deciduous hardwoods and a great variety of shrubs that require more water. The valley bottoms with deep soils are lush with an even wider variety of vegetation including agricultural crops. The wildlife species present vary according to the habitat preferences defined earlier.

Land uses have reduced vegetative quantity and diversity in the past few hundred years, but of the various coal regions, the Appalachian Coal Region maintains the highest diversity. Natural primary productivity is moderate to high (8.9 tons per acre per year in forests to 17.8 tons per acre per year in floodplain areas). Forest cover can return naturally within 10 to 30 years after severe disturbance. This natural productivity, combined with excellent climatic conditions, gives the Appalachian Coal Region higher potential for reclamation than the western coal areas. Currently, coal mining rehabilitation can rapidly establish a ground cover of grasses and legumes and restore suitable fish and wildlife habitat for many species. Research has not been oriented towards recreating original composition and diversity of native forests, and therefore it is not yet possible to evaluate whether current reclamation will be able to restore land to original or better productivity for tree growth in this region. Harvesting of forest products is possible within 30 years after reclamation.

4.1.2 The Environment and Man

The history of mankind in the Appalachian Coal Region can be divided into the Paleo-Indian period (prior to 8000 B.C.), the Eastern Archaic tradition (8000 to 1200 B.C.), the Woodland tradition (1200 B.C. to 900 A.D.), the Mississippian period (900 A.D.-1650 A.D.), and the proto-historic and historic cultures.

The Paleo-Indian occupation is reflected in the Meadowcroft Rock Shelter site in Washington County, Pennsylvania, dated at 14,200 B.C. These Indians were nomadic hunters who used hunting implements, pebble-choppers, hand axes, and scrapers.

The loss of traditional food sources at the end of the Pleistocene is thought to have led to the development of the Archaic tradition. Hunting continued, but fishing and plant gathering became more common. Populations increased and life became more sedentary. Earliest pottery in the southeastern U.S. is thought to have been made in Georgia in approximately 2000 B.C.

During the Woodland tradition, pottery manufacturers flourished, villages grew in size, and social organization became more formal; burial mounds were a distinctive feature of this tradition. The Mississippian culture, with large, permanent villages, riverine agriculture, and ceremonial mounds, was the next major influence, most evident in the Southern Appalachian Coal Region. During the proto-historic period, riverine agriculture, hunting, and fishing continued to provide subsistence. The dominant aboriginal groups included the Chickasaws, Choctaws, and Creeks.

Approximately 40 archaeological sites throughout the Appalachian Coal Region, remnants of prehistoric and proto-historic cultures, are listed on the National Register of Historic Places. The potential remains for discovery of more values

during future site-specific surveys, particularly in sparsely inhabited areas near lakes and streams.

The beginning of the historic period is commonly defined by the arrival of Hernando deSoto (who explored parts of the Appalachian and Gulf of Mexico areas in the 1500's), but the major influx of Europeans did not start until the early 1700's. The first white settlements were built in the early 1800's as the British and French competed for land. The settlers were primarily farmers (raising corn, hogs, cattle, cotton, and tobacco) with secondary occupations as blacksmiths, cobblers, and millers. Slavery was important in the Southern Appalachian Coal Region and parts of the Central Appalachian Coal Region. Railroads, wagon trains, and steamboats helped the settlers penetrate into the frontier and displace the native Americans.

As early as the 1830's, coal mining had begun to rival the cotton industry in some areas. By 1860, factories (producing lumber, carriages, cotton and wool products, and machinery) and coal mines were active throughout the Appalachian Coal Region.

The Civil War sparked mineral activity (smelting and casting furnaces) throughout the Appalachian Coal Region. During the War, many industries, particularly in the Central and Southern Appalachian Coal Regions, were damaged. Cotton production gave way to new industries such as iron and steel manufacturing in the late 1800's. As these industries grew, so did the need for coal.

There was steady economic progress after the turn of the century. Coal production was booming in the 1920's. Other industries that began to grow included steam, natural gas, oil, and electricity.

Over 600 historic sites (houses, covered bridges, iron furnaces, railroad buildings, battlefields, land-mark oil wells, and other structures), reminiscent of the Appalachian Coal Region's varied and colorful history, are listed on the National Register of Historic Places. This comprises one third of all the National Register sites in the coal regions.

There is wide variance in the socio-economic characteristics of the three regions. The Appalachian Coal Region, as a whole, is very distinct from the Western regions. Tables 4-1, 4-2, and 4-3 show population, employment, and other socio-economic characteristics of the three regions.

The Northern Appalachian Coal Region is the most densely populated with a population of over 8,019,000 in 1975 and a density of over 150 people per square mile. The Central and Southern Appalachian Coal Regions both have populations over 2,000,000, but the density in the Central Appalachian Coal Region is slightly less than 60 people per square mile, while in the Southern Appalachian Coal Region it is almost 100 people per square mile. All three regions experienced high out-migration rates during the 1960's. In the 1970's, out-migration in the Northern Appalachian Coal Region slowed considerably and the other two regions gained population.

In the region as a whole, manufacturing and wholesale and retail trade have replaced agriculture and mining, important occupations in earlier history, as the major employment sectors. In 1975, these sectors employed from 36 to 53 percent of the populations of these regions.

In 1975, coal mining employment ranged from only 1 percent in the Southern Appalachian Coal Region to 12 percent in the Central Appalachian Coal Region. Development of other minerals employed less than 4 percent of the regions' populations, while agriculture employed 4 to 10 percent. In small localized areas throughout the region, however, minerals development or agriculture may provide the dominant employment opportunity.

Land uses are varied. Most farms are small (averaging less than 160 acres each), and the major crops include cotton, soybeans, corn, wheat, sorghum grain, hay, and fruit. Some of the best farm land is along the Ohio River, as it was in prehistoric and historic times. Beef cattle, sheep, and hogs remain important products of the agricultural sector.

As mentioned previously, there is active mining throughout the region. Federal leasable minerals include oil, gas, and coal. The greatest potential for development of federally owned oil, gas, and coal is found in the Southern Appalachian Coal Region. Saleable minerals in the Appalachian Coal Region include sand, gravel, shale, and clay. The most important hardrock minerals are iron, zinc, and copper.

Most of the federally-owned coal reserves of the Appalachian Coal Region are located in various National Forests, which are scattered throughout Alabama, Kentucky, Ohio, Pennsylva-

TABLE 4-1

POPULATION AND ECONOMIC CHARACTERISTICS IN THE NORTHERN APPALACHIAN REGION(a)

1975 Total Population[a]	8,019,531
Total Area (square miles)[a]	53,120
Population per square mile (1975)	151.0
Per Capita Personal Income (1975)	$5,035
Per Capita Personal Income as a Percent of National Average (1975)	99

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	17,757	1	99,503	0-1
Other Agriculture	74,931	3	279,375	1
Metal Mining	2,981	0-1	880	0-1
Coal Mining	53,274	2	896,422	3
Oil and Gas	12,982	0-1	154,875	0-1
Other Mining	7,377	0-1	52,430	0-1
Construction	116,867	4	1,760,699	6
All Manufacturing	934,034	33	12,125,795	40
Transportation, Communication, and Public Utilities	129,432	5	2,311,325	8
Wholesale and Retail Trade	547,078	20	4,433,231	14
Finance, Insurance, and Real Estate	97,113	3	988,438	3
Other Services	378,951	14	3,927,846	13
Federal Govt.	46,496	2	685,095	2
State and Local Govt.	376,057	13	2,868,185	9
TOTAL	2,795,330		30,584,099	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

TABLE 4-2

POPULATION AND ECONOMIC CHARACTERISTICS IN THE CENTRAL APPALACHIAN REGION(a)

1975 Total Population[a]	2,069,980
Total Area (square miles)[a]	35,292
Population per square mile (1975)	58.65
Per Capita Personal Income (1975)	$4,009
Per Capita Personal Income as a Percent of National Average (1975)	79

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	12,750	2	24,726	0-1
Other Agriculture	44,855	8	93,889	2
Metal Mining	-	-	-	-
Coal Mining	71,304	12	1,262,813	21
Oil and Gas	3,310	1	31,195	0-1
Other Mining	2,765	0-1	9,008	0-1
Construction	22,804	4	409,618	7
All Manufacturing	112,632	19	1,250,226	20
Transportation, Communication, and Public Utilities	19,959	3	494,300	8
Wholesale and Retail Trade	101,901	17	837,525	14
Finance, Insurance, and Real Estate	17,936	3	174,169	3
Other Services	66,858	11	735,106	12
Federal Govt.	13,886	2	206,263	3
State and Local Govt.	92,803	16	622,461	10
TOTAL	583,763		6,151,299	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

TABLE 4-3

POPULATION AND ECONOMIC CHARACTERISTICS IN THE SOUTHERN APPALACHIAN REGION (a)

1975 Total Population[a]	2,289,614
Total Area (square miles)[a]	23,225
Population per square mile (1975)	98.6
Per Capita Personal Income (1975)	$4,551
Per Capita Personal Income as a Percent of National Average (1975)	90

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	8,713	1	38,269	0-1
Other Agriculture	46,610	6	132,660	1
Metal Mining	-	-	-	-
Coal Mining	6,299	1	124,581	1
Oil and Gas	-	-	-	-
Other Mining	3,972	0-1	12,401	0-1
Construction	47,836	6	592,107	7
All Manufacturing	260,722	30	2,656,267	30
Transportation, Communication, and Public Utilities	29,965	3	602,998	10
Wholesale and Retail Trade	165,260	19	1,445,685	16
Finance, Insurance, and Real Estate	39,359	5	433,204	5
Other Services	93,809	11	1,232,646	14
Federal Govt.	48,520	6	799,721	9
State and Local Govt.	106,450	12	782,012	9
TOTAL	861,545		8,852,551	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

nia, Virginia, and West Virginia. National Forest coal reserves total approximately 679,000 acres. The largest concentration of Federally-owned coal on both Federal and private surfaces occurs in Alabama, where about 40 percent of all Federal reserves of the Appalachian Coal Region are located. Federal coal reserve acreages on state surface, private surface, and National Forests are 80,878; 91,980, and 506,126 respectively.

In the Appalachian Coal Region, coal is transported by waterway, railroad, conveyer belt, and truck. There are no coal slurry lines. The Appalachian coal is closer to demand centers, and transportation costs are lower than those involved in development of western coal. Some problems in transport of coal in the region exist, however. Inadequate lock systems and congestion in the waterway system (which includes the Mississippi, Ohio, Greer, Warrior, and other rivers) are causing bottleneck delays in some areas. Abandonment and deterioration of railway lines are making transport by rail more difficult in areas like West Virginia. The use of trucks is growing as coal production increases. This results in increased noise and air pollution, road congestion, and safety hazards. Some counties have resorted to levying taxes to correct environmental damage caused by coal trucks.

Other land uses include urban and suburban development, communication sites, powerlines, gas pipelines, sand and gravel pits, and sanitary landfills. Access to most federally owned coal is afforded by county or state owned and maintained, all-weather, paved or gravel roads of varying quality.

Recreation is an important land use to be considered. The Appalachian Coal Region has over 138 state parks, 10 state forests, and 10 other state-owned recreational facilities, covering over 511,000 acres and attracting over 56 million visitors a year. Camping, hunting (deer, turkey, and small game are most popular), fishing (bass, blue gill, trout, and catfish primarily), boating, spelunking, hiking, rockhounding, and skiing are just a few of the opportunities available.

The region contains many rivers presently included in the Wild and Scenic Rivers System (e.g., 45 miles of the Obed River in Tennessee, 33 miles of Little Beaver River in Ohio). Others are being considered for inclusion (e.g., parts of Pine Creek in Pennsylvania; Sipsey Fork River in Alabama). There are also four wilderness areas, totaling nearly 48,000 acres, in the Central and Southern Appalachian Coal Regions. Three trails (North Country, Kittanning, and Potomac Heritage) are being considered for inclusion in the National System of Trails.

About 23 billion tons of coal had been extracted from the beginning of mining in the region until 1965. One-third of this was from the Pittsburgh coal bed, making it one of the most valuable beds in the U.S. The number of coal beds in the region varies from 10 in Pennsylvania to 62 in West Virginia.

4.2 EASTERN INTERIOR COAL REGION

The Eastern Interior Coal Region is located within the Central Lowland and Interior Low Plateaus of the United States. This region encompasses approximately 59,000 square miles in 85 Illinois, 23 Indiana, 18 Kentucky, and two Iowa counties.

4.2.1 The Environment

The Eastern Interior Coal Region is a combination of smooth and irregular plains within the Mississippi and Ohio River watersheds. The Illinois, Indiana, and Iowa portions of the plains are smooth almost to Kentucky, due to the influence of the Illinois glacier. The remainder of the region is unglaciated and its topography is therefore hilly. In this portion of the region, local relief varies from 100 to 500 feet with steep bluffs occurring along many of the rivers. The elevation of the entire region does not exceed 1,000 feet above sea level.

The region's geological formations are primarily sedimentary rocks from the Upper Paleozoic Era of approximately 300,000,000 years ago. Rock strata are dominated by sandstones, limestones, conglomerates, and shales. Various paleontological formations are associated with these strata, as well as the region's coal deposits.

The principal coal bearing formations are the Lower Pennsylvania, Pottsville, and Allegheny Formations. The coal deposits are composed almost entirely of low-volatile bituminous. A three-county area of southern Illinois, however, contains high-volatile bituminous deposits. In addition to coal, the mineral resources of the region include petroleum, clay, crushed stone, gravel, and sand.

The region's total reserve base is estimated to be 88.9 billion tons.

To a great extent, soils in the northern half of the region have derived from glacial drift and windblown deposits. Soils from two to five feet deep predominate in this portion of the region. Top soil is generally black, friable, and high in organic content. The unglaciated southern portion of the region has soils with a thinner layer of top soil. Soils in this area are derived from windblown deposits overlaying glacial till. These soils have a gray-brown surface layer that is medium to highly basic. This surface soil often overlies an impermeable clay pan that produces poor internal drainage. Soils of the entire region are fertile. Those in the northern portion are the more productive.

A temperate climate prevails throughout the region. Annual mean temperatures range from 48°F in the north to 60°F in the south. Seasonal extremes range from -20°F to 110°F.

Precipitation volumes also increase from north to south; the northern areas receive about 30 inches a year, while the southern areas receive 40 inches per year. The region has snowfall, although it is generally less than 10 inches annually. Storms are most frequent in the winter and spring months. Summer storms generally track from the north and are weaker. Autumns are often dry with little storm activity until November. Although short dry periods do occur, the region is not vulnerable to sustained droughts.

The region is subjected to a variety of winds from Canada, the Great Plains, and the Gulf Coast. Wind speeds average approximately 10 miles per hour, which is above the nation's average. The lack of topographic barriers permits continual ventilation and air quality is good. There are generally less than 20 days a year during which the region is subjected to high levels of air pollution. These episodes are generally short-lived. Certain urban centers do create some localized air quality problems. These problems are restricted to Evansville, Indiana, where high particulate and moderate sulfur dioxide levels occur; Terre Haute, Indiana, where high particulate levels occur; Springfield, Illinois, where moderate particulate levels occur; and Peoria, Illinois, where moderate particulate levels occur.

With its precipitation patterns and two major waterways, the Eastern Interior Coal Region generally has plentiful supplies of water. A dendritic drainage pattern is formed by the Mississippi and Ohio Rivers, their major tributaries such as the Illinois and Wabash Rivers, and the smaller tributaries of these. During heavy rains and spring thaws, these rivers are prone to damaging floods.

Water quality varies throughout the region. For most uses, it is generally satisfactory or can be treated. Agricultural runoff causes localized problems with bacterial contaminants, nitrogenous pollutants, and suspended solids. Additionally, various industrial pollutants are found in the region's scattered urban centers.

It is estimated that 42.3 million acre-feet of fresh to slightly saline groundwater is in storage in the region, and some towns and cities have had difficulty obtaining wells yielding good water at reasonable costs. Over most of the region, however, fresh groundwater, at least in small to medium quantities, is not difficult to develop. Some local overpumping has resulted, since only about 4.1 million acre-feet of fresh groundwater is recharged to the system each year. Some municipalities have found it less expensive and more satisfactory to discontinue their poor groundwater sources and develop treated surface waters. Over most of the region, the depth to saline groundwater is less than 500 feet.

The above-described environmental aspects have created an ecotone-type ecology in the region. This means that the region is situated in the transition zone between the eastern deciduous forest and the Great Plains grasslands. An oak-hickory forest dominates the natural vegetation of the Kentucky, Indiana, and southern Illinois portion of the region. The remaining portion is dominated by farmland and an oak savannah ecosystem. Intensive agricultural practices occur in the region, so much of the natural vegetation has been removed. Only about 15 percent of the region is now forested.

Where natural forests exist, dominant tree species include fir, white and swamp oaks, hickory, ash, poplar, and sweet gum. Associated ground cover includes shrubs (such as mountain laurel, rhododendron, dogwood, wisteria, sumac, buckthorn, alder, and hawthorn), numerous forbs, and grasses (such as winged pigweed, bishopcap, love grass, panic grass, and morning glory). Net primary productivity for forested areas is about 8.9 tons per acre per year.

Relict prairie areas exist in limited portions of the oak savannahs that have not been disrupted by agriculture. They are vegetated by mixed grasses, legumes, and other herbaceous species. Typical species are bluestem, switchgrass, and Indian grass (representative of tall grass prairie); little bluestem, needlegrass, and western wheat-grass (representative of mid-grass prairie); and buffalo grass, blue grama, and side-oats grama (representative of short grass prairie). There is a general tendency for the short grasses, more typical of western prairies, to push eastward onto the heavier soils of this region, and the tall grasses (typically eastern) to push westward onto the lighter soils. Net primary productivity of the remaining prairie in the region is about 6 tons per acre.

Typical vegetation of the wetlands and bottom areas includes spike rush, sedges, milkweed, water primrose, cattails, pondweeds, and lizardtails. These wet areas are highly productive and are valuable habitat to waterfowl using the Mississippi flyway.

The forests and prairies of the region serve as habitat for a wide variety of other wildlife species. Due to extensive farming, most wildlife within the region is compatible with man's activities. Some even depend on the farmer's fields for food and cover. Typical forest mammals include whitetail deer, eastern cottontail, gray squirrel, gray fox, and raccoon. Species typical of the prairie areas and edge habitat between forest and prairie include whitetail deer, woodchuck, red fox, and coyote. Small mammals, such as mice, shrews, and bats are numerous in both prairie and forest areas. Furbearers, such as mink, beaver, and muskrat, occur along waterways and in marshy habitats.

Major upland game birds found in the region include ring-necked pheasant, ruffed grouse, mourning dove, bobwhite, and wild turkey. Wetlands and waterways provide habitat for waterfowl using the Mississippi flyway, such as bluewinged and greenwinged teal, pintails, wood ducks, lesser scaup, black ducks, mallards, and lesser snow and Canada geese. Among the principal non-game birds are redtailed hawk, turkey vulture, great horned owl, green heron, chimney swift, cardinal, indigo bunting, crow, bluejay, brown thrasher.

Among the 15 species of game fish in the region, largemouth bass is the most popular. Other gamefish of local importance include bluegills, crappie, northern pike, catfish, yellow perch, white bass, and yellow bass.

Reptiles and amphibians found within the region include box turtles, soft-shelled turtles, snapping turtles, copperhead snakes, king snakes, cricket frogs, bull frogs, and a variety of lizards and salamanders.

Although most species have adapted to man, a few have not. Their habitats have diminished with agricultural advancement to the point where populations are very restricted and are threatened or in danger of extinction. Federally listed endangered species of wildlife within the region include the Indiana bat, bald eagle, tuberculated-blossom pearly mussel, Sampson's pearly mussel, and peregrine falcon. There are no Federally listed endangered plants within the region's boundaries, but numerous plant species are presently under consideration for threatened or endangered designation by the U.S. Fish and Wildlife Service. The plants in the relict prairies are not endangered, as they are common in other prairies in the West.

The ecosystems within the Eastern Interior Coal Region are capable of recovery after human disturbances. With proper soil conditions, natural succession can return a grassland to a near original state within a decade. Forest lands require much longer to return to a stage similar to virgin timber. Natural succession, however, can return a cleared forest to an immature forest in less than 50 years, given proper conditions. With adequate management, the lands of this region could be reclaimed after coal mining operations.

4.2.2 The Environment and Man

The agricultural opportunities of the Eastern Interior Coal Region have historically been its major attraction for human beings. Timber and other natural resources have also been attractive but to a lesser degree. Original Indian populations were primarily village farmers. Tribes of Illinois, Miami, and Shawnee Indians produced maize and grains from the fertile soil. White men did not arrive until 1672, when two French explorers, Joliet and Marquette, led an expedition up the Mississippi and Illinois Rivers. Their journey initiated the education of the European colonists to the region's abundant agricultural opportunities. Eventually, settlers were drawn westward from the deciduous forests of the original 13 colonies to the agricultural advantages of the prairie fringe. The

acquisition of the Northwest Territory by the United States in 1787 provided for this colonial expansion. In 1820 settlement was limited to the Ohio Valley, but shortly thereafter settlements were found scattered throughout the entire region.

In 1836 a blacksmith's apprentice named John Deere was drawn to Grand Detour, Illinois, from Vermont. In 1837 he built the world's first steel moldboard plow. His invention became famous as "the plow that broke the plains." Thereafter farming became the primary regional activity and most of the land was cleared. Agriculture is still the primary land use over the entire region and is a significant contribution to the area's economic base. Most farmers grow corn, soybeans, grains, and hay for export or livestock feed. Individual farms vary in size up to 500 acres.

The timber production of the southern portion of the region has added to the region's economy. Oil is another natural resource that was found in moderate abundance in the region. It also contributes to the area's economic base.

Twentieth century industrial development has added greatly to the region's economy, but is essentially limited to urban centers. The major cities that support most of the industry are Peoria, Springfield, and Decatur, Illinois; Burlington, Iowa; Evansville, Indiana; and Owensboro, Kentucky. Coal production has played an important role in the region's industrial development; together with oil, it provides most of the energy supply. Manufacturing is the major contributor to employment, involving 26 percent of the total workforce. Table 4-4 provides additional economic data, illustrating the relative importance of specific sectors of the economy.

Surface transportation via water and rail was instrumental in urbanization. Water carrier service is available on the Mississippi, Ohio, and Illinois Rivers.Major railways serving the region include the Chessie System, Norfolk and Western, Illinois Central Gulf, Louisville and Nashville, Southern, and ConRail. In addition to these modes, a modern highway network is used for commercial and private transportation. The primary highways used for bulk commodity transportation are the interstate highways. The region is traversed by Interstate Highways 24, 64, 70, 74, 55, and 57. Oil and gas pipelines are also located in the region. Coal slurry pipelines are not present.

Historic agricultural development and recent community development have been instrumental in creating a large population growth in the Eastern Interior Coal Region. Presently, there are over 5 million inhabitants within the region. The 1975 population density was approximately 85 persons per square mile. The rural sector of the region is fairly stable, while the urbanized centers are experiencing mild growth. The area has never been exposed to any major boom town phenomena. Cultural development within the region is highly varied. Indian artifacts from cultures dating to 2000 B.C. have been discovered in Greene County, Illinois. Remnants of the Wabash and Erie Canals of the mid 1800's still remain. Historical sites relating to Abraham Lincoln's past are found in numerous locations. Over 200 individual historic sites within the region are identified for preservation by the National Register of Historic Places.

Most federally-owned coal reserves are located in the National Forests within the boundaries of the Eastern Interior Coal Region. National Forest coal reserves for this region total nearly 117,000 acres. The region's largest concentration of Federal coal ownership under Federal and private surface occurs in Illinois, where some 95,499 acres are located. Federal coal reserve acreages for private surface and National Forests are 7,645 and 116,809 respectively.

4.3 WESTERN INTERIOR COAL REGION

The Western Interior Coal Region is in the central plains of the United States. This region encompasses approximately 98,000 square miles in eight Arkansas, 53 Iowa, 36 Kansas, 56 Missouri, nine Nebraska, and 25 Oklahoma counties.

4.3.1 The Environment

The Western Interior Coal Region contains a wide variety of topographic features, from irregular glaciated plains in the north to steep-sided ridges and mountains in the south. Elevations vary from 500 feet in the northeast portion of the region to 2,000 feet in the southern highlands. The region is situated within the Central Lowland physiographic province and has a generally flat to rolling topography. There are some eroded mountains in eastern Oklahoma and western Arkansas known as the Ouachita and Boston Mountains.

TABLE 4-4

POPULATION AND ECONOMIC CHARACTERISTICS IN THE EASTERN INTERIOR REGION (a)

1975 Total Population[a]	5,191,721
Total Area (square miles)[a]	65,153
Population per square mile (1975)	79.7
Per Capita Personal Income (1975)	$5,316
Per Capita Personal Income as a Percent of National Average (1975)	105

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	51,897	3	344,185	2
Other Agriculture	148,825	8	1,659,599	8
Metal Mining	-	-	-	-
Coal Mining	25,870	1	300,128	2
Oil and Gas	4,500	0-1	100,193	0-1
Other Mining	9,579	0-1	63,118	0-1
Construction	70,692	4	1,124,798	6
All Manufacturing	507,948	26	5,980,049	30
Transportation, Communication, and Public Utilities	77,306	4	1,240,601	6
Wholesale and Retail Trade	376,103	19	2,896,369	15
Finance, Insurance, and Real Estate	65,538	3	655,676	3
Other Services	239,895	12	2,165,833	11
Federal Govt.	84,849	4	1,007,967	5
State and Local Govt.	293,538	15	2,193,087	11
TOTAL	1,956,540		19,731,603	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

Present topography and land forms are largely a result of surface rocks. Resistant rocks, such as granite, sandstone, and limestone, generally form high ridges, hills, and mountain peaks, whereas nearby outcrops of shale and other easily eroded rocks form valleys and lowland areas.

In the past, forces within the earth have caused portions of the region to alternately sink below and rise above sea level. Large areas were often covered by shallow seas, and thick layers of sediments were deposited and subsequently lithified into shales, limestones, and sandstones. Later, these areas were uplifted and the sedimentary rocks were exposed and eroded.

The gently sloping hills of the northern portion of this region are composed of alluvium, glacial drift, and loess, underlain by Paleozoic sandstones, limestones, shales, and coal seams in horizontal or nearly horizontal beds with isolated faulting and gentle folding. The east-west trending ridges and valleys of the Ouachita province were formed during the early Paleozoic Age through extensive folding and faulting.

The coal beds of the region are Upper Carboniferous (Pennsylvanian) in age and mostly high-volatile bituminous in rank. They are generally of better quality than the coals of the West, but are also higher in sulfur content. The principal coal-bearing formations throughout most of the region are the Lower Pennsylvanian, Pottsville, and Allegheny Formations. They comprise a lower series, that contains most of the coal, termed the Des Moines Group, and an upper series termed the Missouri Group. The region's estimated reserve base is 16 billion tons.

Most of the Federal coal in the region is in the southern part, in Oklahoma. In this area, and in western Arkansas as well, mountain-building forces of the Ouachita disturbance sufficiently devolatilized the coal beds to raise their rank to low-volatile bituminous and some localized semianthracite deposits. The coal is mostly of coking quality and is contained in rocks of the Hartshorne Sandstone and the McAlester Shale. The most important beds are the Lower Hartshorne, 2.5 to 6 feet thick; the Upper Hartshorne,1.75 to 5.5 feet; and the McAlester Shale, 1.75 to 4 feet thick.

Most hard rock minerals are formed as a result of igneous activity. Ore mineral such as silver, lead, and zinc occur within the tri-state area of Arkansas-Missouri-Oklahoma. "Common variety" mineral materials, such as sand and gravel, building stone, crushed stone, and common clay, are abundant in most of the region. Building stone and crushed rock are quarried from sandstone and limestone. Sand and gravel are obtained from river alluvium, and clay is obtained from shale.

Coal is plentiful in the region, but production is principally in eastern Oklahoma. Oil and gas producing horizons occur principally in Oklahoma and Kansas in several different formations at a wide range of depths. Fossil-bearing strata occur throughout the region. The only ones of significance in the Federal coal reserves are those associated with coal seams of the Middle Pennsylvanian Hartshorne, McAlester, Savanna, and Boggy Formations.

The climate of the Western Interior Coal Region is characterized by hot summers and cold winters. Ranges in temperature and precipitation are pronounced. The area tends to be dominated by cold air from the Canadian arctic in winter and warm air from the southwest in summer. Temperatures in the southern portion average 40°F in January and 80°F in July. In the northern portion, they average 20°F in January and 70°F in July. The mean annual freeze-free days range from 150 in the north to 210 in the southwest.

Most of the area receives between 32 and 48 inches of precipitation per year. Months with the highest precipitation are March, April, May, and June, at the start of the growing season. Parts of the area receive over 4 inches per month during this time although they are also exposed to occasional short-lived droughts. Fall rains may average over 2 inches per month. Winter snows, particularly in the north, are common. The humidity averages between 60 and 70 percent most of the year, with some portions having a higher average in the fall and winter. The relatively high amounts of rainfall and seasonally warm temperatures combine to provide very favorable conditions for plant growth.

The area is generally windy. Average speeds near the ground are 11-14 mph. When precipitation has been sparse fugitive dust and dust storms are common. The winds are typically out of the west and northwest in the winter and out of the south the rest of the year. This area is subject to many tornadoes every year.

Air quality, in terms of particulate, sulfur dioxide, and nitrogen dioxide content, is good in

most areas of the region. Some variation does exist, particularly in urbanized areas of the region. These variations are located in Kansas City, Missouri, where moderate particulate matter and sulfur dioxide levels occur; Omaha, Nebraska, where moderate particulate matter and sulfur dioxide occur; and Tulsa, Oklahoma, where low particulate matter and moderate nitrogen dioxide occur.

Most of this region has abundant supplies of water, including a considerable number of lakes and reservoirs. However, most industries and municipalities must treat surface water and some groundwater before use. The quality of surface water ranges from low dissolved solids and high sediment concentrations during high flow periods to high dissolved solids and low sediment content during low flows.

Surface-water runoff averages about 7 inches over most of the region, ranging from 3 inches in the northwestern to extremes of 30 inches in the southern mountains. Where standing bodies of water exist in the region, evaporation ranges from about 36 inches in the north to 54 inches in the southwest. Devastating floods resulting from thunderstorms are not uncommon.

The quality of the surface water is generally good, especially in the east where the total dissolved solids are generally moderate. In the western part of the region, particularly in the northwestern and southwestern areas, the rivers not only carry a greater concentration of total dissolved solids but a much heavier load of suspended solids. The Des Moines, Iowa, Missouri, and Arkansas Rivers have the poorest quality water. In some streams, oil-field wastes and other industrial and municipal wastes have created serious problems.

Groundwater conditions vary widely with respect to quantity and quality. In the Iowa and northern Missouri portion of the region, well yields vary, but wells are generally less than 250 feet deep. Groundwater supplies in the unglaciated southern portion of the region can be obtained from river alluvium, shale, sandstone, limestone, and dolomite aquifers. The river alluvium generally yields moderate to large supplies of water of good quality. The shallow sandstone and limestone bedrock aquifers generally yield less than 25 gallons per minute of medium to poor quality water. In some parts of the area wells over 1,000 feet deep which penetrate the Cambrian and Ordovician carbonate aquifers underlying the coal bearing strata yield over 500 gallons per minute of good to medium quality water. The dense slaty shale and hard sandstone that largely make up the Ouachita Mountains yield a poor supply of groundwater in that area.

The soils of the region vary considerably but are mostly sedimentary in origin. Soils range from organic rich bottomland to sandy hillside loams. The dominant soils in the northern part of the region are black organic rich soils that often have a brown clay subsoil. These soils developed from glacial till or loess and are generally quite fertile. The prevailing soil in the south is a dark red loam, made up of decomposed sandstone and limestone. The river valleys often have rich deposits of alluvium.

The Western Interior Coal Region includes a portion of the continent where the eastern deciduous forests merge with the prairies and plains of the west. Accordingly, there is a transition between the vegetative communities typical of both biomes. The deciduous forest, tall-grass prairie, and transitional zones, including the savannahs, make up the major habitat types. This mixture of habitats within the region provides suitable food, shelter, and cover for a variety of wildlife.

The mixed oak-hickory forest association is common in the eastern portion of the region, grading to oak-hickory-pine forest in the southeastern portion. Associated understory vegetation includes dogwood, redbud, holly, sassafras, winged elm, wild grape, spicebush, sumac, and numerous native grasses and forbs. On well-shaded slopes, mosses, liverworts, and fruticose lichens form a continuous mat over the surface of the ground. Few mammalian species develop large populations in these forest associations. Whitetail deer, raccoon, red fox, gray fox, eastern gray squirrel, fox squirrel, brush mouse, eastern woodrat, eastern cottontail, striped skunk, and opossum are typical mammals. Typical birds include those that prefer the upper canopy layers, such as vireos and warblers, and those occupying the lower canopy and the forest floor, such as thrashers, wood pewee, rufous-sided towhee, cardinal, wild turkey, and ruffed grouse.

The bottomland forest association occupies fertile bottomland soils of alluvial origin. This vegetative association is found along water bodies and stream courses. The more common species are

willow, cottonwood, American elm, sycamore, and sweet gum. Boggy areas support a heavy cover of herbs and ferns. Understory vegetation consists of numerous small trees, shrubs, and lichens. As the forests diminish to the west, and the prairies become extensive, the relative amount of grassland and woodland varies greatly in different parts of the region. For the most part, grassland vegetation consists of a mixture of such dominants as big bluestem, little bluestem, Indian grass, silver beard grass, and switch grass. Wildlife typical of prairie areas and agricultural lands within the region include whitetail deer, eastern cottontail, red fox, and coyote. Typical birds in these open habitats include horned lark, crow, cowbirds, grasshopper sparrow, bobwhite, mourning dove, and ring-necked pheasant. The greater prairie chicken may be found in the savannah type.

Distribution of water plants usually is not controlled in the same way as occurrence of the plants growing in adjacent terrestrial habitats. Many aquatic species rely on the various lakes, ponds, or streams throughout the region. Some are restricted to small areas or special types of lakes. Species which are common to the aquatic vegetation community of the region include water willow, cattails, spikerushes, duckweeds, watervelvet, water chinquapin, waterlilies, spatterdock, smooth water primrose, and a wide variety of submerged aquatic aggregations.

Water bodies within the region are generally highly productive and support a variety of fish including bullheads, yellow perch, bluegills, large mouth bass, crappie, shiners, and minnows. Furbearers associated with these aquatic habitats include mink, muskrat, beaver, otter, and raccoon. Typical birds include red-winged blackbird, herons, gulls, wood ducks, mallards, scaup, snow and Canada geese, and bald eagle.

Some of the amphibians and reptiles common in the region include cricket frog, bullfrog, collared lizard, sixlined race runner, box turtle, spiny soft-shelled turtle, ringnecked snake, kingsnake, gartersnake, and ground snake.

There are 10 species of animals occurring within the Western Interior Coal Region that now have protected status as endangered species: These include the red wolf, Indiana bat, gray bat, peregrine falcon, Eskimo curlew, bald eagle, red-cockaded woodpecker, and Bachman's warbler. Presently, there is only one plant species in this region listed as endangered. This is the northern wild monkshood, with known distribution in Iowa. However, there are numerous other plants under consideration for designation as endangered or threatened. These may be given protection by the U.S. Fish and Wildlife Service.

The above-described ecosystems within the Western Interior Coal Region's boundaries are capable of natural reoccurrence after human disturbance. Prairie grasses can reoccur through a natural succession process within a few years of disturbance. Oak-hickory forests, however, require a much longer period to regenerate, although they too can naturally reoccur. These ecosystems would be reclaimable following coal mining operations; however, proper attention would be necessary to assist the reclamation process.

4.3.2 The Environment and Man

Evidence has been found that man existed in the Western Interior Coal Region more than ten thousand years ago. Artifacts reveal that wandering tribes of hunters and gatherers were the first inhabitants of the region. Gradually, some of the tribes became sedentary and agricultural communities developed. The region is rich in archeological sites dating from many periods. Over 60 of these sites are included in the National Register of Historic Places.

Recorded history began in 1541 when Francisco Vasquez de Coronado crossed the region in his search of the fabled city of Cibola. In the seventeenth and eighteenth centuries, French trappers and hunters wandered down the Missouri River and settled on its tributaries. The Missouri River was the principal travel route for the explorers of the early 1700's, and became the standard route for the traders travelling between St. Louis and the Mandan Indian villages in the northern Great Plains during the 1780's and 1790's. By 1800 some towns and forts were established and some areas in the eastern part of the region along the Missouri were settled.

A new era in the development of the region commenced with the Louisiana Purchase of 1803. Expeditions were sent by the U.S. Government to explore this newly acquired territory for its resources. Following further explorations, important trade routes and eventually cattle trails became established during the nineteenth century. The Texas Road, the Butterfield Stage Line, the

Chisolm Trail, and the California Road stimulated the founding of trading posts and then settlements along these routes.

At present, there are over 450 sites or districts from this region included in the National Register of Historic Places. These listings include sites similar to those in the other eastern regions (houses, churches, and courthouses), together with a range of sites associated with early travel in the area, new settlers, contacts with the American Indians, and events of the Civil War.

The region has a long history related to agriculture as the dominant land use. Present day agriculture in the region includes the enormously productive feed-grain and livestock producing areas of central Iowa, much less productive general farming in eastern Oklahoma, and poultry production in the Arkansas portion. In the northern portion of the region, over 75 percent of the land area is in cropland, and a substantial part of this area is prime farm land. In the Kansas and Missouri portions, cropland represents from 50 to 70 percent of the land area. In the Oklahoma and Arkansan portions, only 15 to 30 percent of all land is used for crops but a higher percentage of farm land is used as pastures. Principal crops are corn, soybeans, peanuts, cotton, grain sorghums, hay, and fruit. Along the Arkansas River, the cropland is devoted to commercial vegetable production for local canneries because of a plentiful year-round water supply and excellent soil for pasture.

Although cropland is decreasing in many areas and improved pastures are increasing, the size of farms shows a decided increase in acreage as mechanized farming is now the rule and better fertilizers and land management give greater yields with less labor.

In the southern part of the region, where the climate is warm and humid, timber is an important resource. In recent decades, much of the cleared land has been replaced by second and third generation forests. Presently, trees are harvested for timber and wood products, furniture and fixtures, and paper and allied products.

The presence of coal in the region has been known since the 1820's. Mining was not done on a commercial scale until the Missouri, Kansas, and Texas Railroad was built through McAlester, Oklahoma, in 1872. At first, the coal was mined for use as domestic and locomotive fuels. As branch lines were built out into the various coal fields of the region, mining expanded and began producing coal for shipment to distant markets. The steadily rising production continued and reached an all-time high in 1920. However, annual production declined after 1920 as railroads began using diesel-powered locomotives. Production rose again in the late 1940's and 50's, then declined rapidly again as industry switched to oil and natural gas for fuel. The energy problems of the 1970's triggered a new increase in production, with present production nearing the production figures of 1920.

The first natural gas in the region was discovered in the Arkansas portion of the Arkoma Basin in 1902. The first productive well in the Oklahoma portion of the Arkoma Basin was drilled near Poteau, in 1910. This discovery spurred the drilling of numerous shallow wells in the 1910's and 1920's. Many of the zones are still productive or are being used for gas storage. Presently, the only oil and gas producing States in the Western Interior Coal Region are Arkansas, Oklahoma, and Kansas. In 1955, rising natural gas prices encouraged a new wave of drilling activity. Development was hampered at first by the absence of an adequate pipeline network, but new pipelines were built and drilling activity boomed through the mid-1960's. By the late 1960's, however, rapidly increasing drilling costs coupled with stagnant or slowly rising gas prices discouraged new, large-scale drilling activity. In 1973, the energy crisis forced natural gas prices upward and drilling activity increased again. Higher gas prices and steadily advancing drilling technology have encouraged drillers to seek pay zones at ever increasing depths, and new wells in a number of fields are more than 12,000 feet deep.

The tourist and recreation industry is of moderate economic importance, but the region has always been an area of high recreational use. Good roads, proximity to population centers, and publicized recreation resources result in heavy tourist traffic. Two national wilderness areas are located in national forests that are partially in this region. They are Caney Creek with 14,344 acres in the Ouachita National Forest, and Upper Buffalo, encompassing 10,182 acres of the Ozark National Forest. In addition, more than 66 state parks, 40 state recreational areas, 26 state forests and preserves, and 20 other recreation areas lie within the region. Combined annual attendance for these

facilities is over 19 million and their present area is 260,850 acres.

Principal manufacturing, retail and wholesale trade centers in the region are in Des Moines, Iowa; Omaha, Nebraska; Kansas City, Missouri; Kansas City, Kansas; Tulsa, Oklahoma; Fort Smith, Arkansas; and Topeka, Kansas. These large cities are also executive centers for large business such as major oil companies, large corporations, financial and banking institutions. Total employment and earnings in each employment class during 1974 is presented in Table 4-5 along with percentage distribution.

Transportation systems have historically been an influential factor in the development of the region. The Missouri River provided the principal means of access to the west during the early portion of the nineteenth century. Later that century, development was spurred by the advent of the railroads. Today the region is served by eight major railways, barge lines, and by truck service over a widespread highway network including six Interstate Highways. Major air terminals are located in all major population centers and several cities around the region within relatively easy driving distances. Various electrical transmission lines, water lines, microwave paths, telephone lines, gas lines, and oil lines form a network throughout the region. There are no coal slurry pipelines in the region.

Socioeconomic data for the Western Interior Coal Region are presented in Table 4-5. The population totaled over 5.8 million in 1975 with a density of 55 persons per square mile. Farm populations vary from 11.3 to 28.1 percent among the counties of the region, with urban dwellers comprising another 58.5 percent of the total. The population was relatively stable during the 1960's with a slight gain between 1970 and 1976.

Land use development and settlement in the region occurred in such a manner that there are no major tracts of land under the Bureau of Land Management's jurisdiction. The only significant Federal lands in this region are the Ouachita and Ozark National Forests, which are under the jurisdiction of the U.S. Forest Service; the DeSoto, Squaw Creek, Swan Lake, Flint Hills, and Sequoyah National Wildlife Refuges, which are under the jurisdiction of the U.S. Fish and Wildlife Service; and scattered reservoirs and military bases, which are under the jurisdiction of the U.S. Department of Defense.

In summary, the region can be described as predominately rural, with numerous farms and ranches; a variety of second growth timbered areas varying from small farm woodlots to managed forest tracts; numerous small rural communities and large metropolitan industrial centers; and an extensive road network which permits mobility and accessibility between them.

4.4 TEXAS COAL REGION

The Texas Coal Region is located entirely within the Gulf Coastal Plain. The region encompasses 37,000 square miles in 51 Texas, four Louisiana, and one Arkansas counties.

4.4.1 The Environment

The Texas Coal Region has major resources, in the form of natural resources, agriculture, and industry. Topographically, it consists of gently sloping, irregular plains and tablelands. Elevation does not exceed 1,000 feet above sea level. The area is underlain with sedimentary rock of the early Cenozoic Era of about 70 million years ago. The soils have never been glaciated. These prehistoric conditions have enabled the preservation of numerous fossil formations which are scattered throughout Texas. Many formations are closely associated with the lignite deposits.

In terms of historical geology, lignite constitutes an early stage of development. It is a low grade coal and contains separable pieces of plant material. The relatively low value of the coal is directly correlated with its recent geologic occurrence. Today's lignite deposits resulted from accumulations of plant material in river deltas, flood plains, and lagoons in the early and middle Cenozoic Era. Subsequent sedimentation compacted this organic matter to its present state.

The region's lignite reserves are estimated to be 3.3 billion tons. Both surface and subsurface deposits exist in most counties. Generally lignite is associated with three major seams which parallel the northeast-southwest boundaries of the region. Surface lignite is associated with the Wilcox or the Yegua-Jackson Group, while subsurface lignite is associated with a seam commonly referred to as the Texas Deep-Basin deposit. Surface deposits are usually less than 90 feet deep and are often found in seams that are 10 to 20 feet thick. Many seams,

TABLE 4-5

POPULATION AND ECONOMIC CHARACTERISTICS IN THE WESTERN INTERIOR REGION(a)

1975 Total Population[a]	5,883,113
Total Area (square miles)[a]	106,957
Population per square mile (1975)	55.0
Per Capita Personal Income (1975)	$5,209
Per Capita Personal Income as a Percent of National Average (1975)	103

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	120,941	5	695,712	3
Other Agriculture	148,071	6	1,189,313	5
Metal Mining	-	-	-	-
Coal Mining	4,398	0-1	24,330	0-1
Oil and Gas	7,000	0-1	351,942	1
Other Mining	9,950	0-1	56,561	0-1
Construction	100,263	4	1,509,177	6
All Manufacturing	453,746	19	4,963,749	21
Transportation, Communication, and Public Utilities	121,222	5	2,276,548	10
Wholesale and Retail Trade	499,512	21	4,330,842	18
Finance, Insurance, and Real Estate	122,726	5	1,326,721	6
Other Services	326,544	14	3,305,990	14
Federal Govt.	120,799	5	1,458,612	6
State and Local Govt.	330,042	14	2,338,467	10
TOTAL	2,365,214		23,827,964	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

however, are thinner and are thus presently unattractive for development. Texas Deep-Basin coal is found up to 5,000 feet below the surface. Most of the subsurface deposits are found in the northeastern half of the region.

Other significant mineral resources are located within this area of Texas and Louisiana. This region is a very major contributor to the nation's petroleum and natural gas production. In addition, ample iron ore, clay, sand, and gravel reserves are available to supply regional construction needs.

Soils of sandy, silty, or clay loams overlay the mineral deposits throughout the region. Soil conditions vary from acidic to basic at varying locations. The soil's organic content also varies among locations, depending not only on natural conditions but also on the particular land use. Soil moisture and consequently soil productivity varies extensively from northeast to southwest according to the degree of precipitation and irrigation.

Climatic conditions are such that the region receives about 48 inches of precipitation in the northeast but only 16 inches in the southwest. This variance is due largely to the variability in the influence of the Gulf of Mexico. The northeastern area is more heavily influenced by the sub-tropical winds from the Gulf. The result is a more humid climate. Proceeding southwesterly, the Gulf's influence diminishes and the region is subjected to the wind currents from interior Mexico and the Southwest. The result is thus an increasingly arid climate in the southwestern portion of the region. These conditions create periodic droughts in the southwestern portion. They do not, however, permit any measurable quantities of snowfall.

Winters are cool with daily mean temperatures ranging from 64°F in the northeast to 70°F in the southwest. Summers are hot. Record temperatures throughout the region exceed 100°F. Temperatures in excess of 100°F occur every summer.

Average wind speeds are approximately 10 miles per hour and are generally southerly or southeasterly. An outstanding characteristic is their steadiness and persistence. The region is continually and consistently ventilated so that no major concentrations of air pollutants (sulfur dioxide, nitrogen dioxides, and particulates) are found within its boundaries. Minor concentrations of particulates do, however, occur at Waco, Tyler, Austin, and San Antonio, Texas.

Like the climate, the region's water characteristics change from northeast to southwest. Runoff is substantial in the northeast (up to 16 inches a year), but is essentially nonexistent in the southwest (down to 1 inch a year). Potential evapotranspiration in the area is highest of all the regions, averaging 42 inches a year over most of the region and exceeding 54 inches a year in the extreme southwest.

Numerous streams, including the Sabine, Brazos, Red, Neches, Trinity, Colorado, and Nueces Rivers, drain the region and empty into the Gulf of Mexico. The combined flow of these rivers and their tributaries is 61.5 million acre-feet per year. Stream sediment levels decrease to the northeast as precipitation and runoff increase. Total dissolved solids range from 270 to over 1,900 milligrams per liter in streams in the western part, and from less than 350 to over 1,200 milligrams per liter in eastern parts of the region. Streams in the area may carry up to several thousand milligrams per liter in areas affected by salt seeps and oil-field activities. Of the total surface water withdrawn, 15.5 million acre-feet are consumptively used each year, primarily for irrigation and industry.

Groundwater is abundant and of good quality. Very high yields, over 1,000 gallons per minute, have been reported from both bedrock and alluvial aquifers. The water generally contains less than 500 milligrams per liter of total dissolved solids, but quality deteriorates with increasing depth. In the southwestern part of the area, some natural groundwaters contain high levels of trace metals and fluoride. Additionally, groundwater quality has been affected in some areas by oil-field activities. Groundwater use in the region is approximately 75,000 acre-feet per year, primarily for public and industrial water supply.

The interplay of these environmental factors contributes to considerable ecological diversity within the region. From northeast to southwest there is a transition in natural vegetation from oak-hickory-pine forest, to oak-hickory forest, to mesquite-oak savannah, and lastly to mesquite-acacia savannah. Of the deciduous forest species, blackjack oak, post oak, and shagbark hickory associations are the more prevalent. Much of the natural vegetation is presently thriving, as approximately 30 percent of the total region is forested.

The primary tree species in the coniferous forests are loblolly pine, shortleaf pine, and

longleaf pine. The vegetation of the region's flood plains differs, however. Cypress, sweetbay, maidencane, cattails, pondweeds, alligator weed, and watermilfoil are dominant plant species in these locations. Mixed shrubs and grasses are the most common types of flora in the mesquite savannahs. In addition to mesquite and acacia, major species include yucca, juniper, little bluestem, gramma, wheatgrass, needlegrass, and buffalograss.

The diverse associations of flora serve as habitats for a variety of wildlife populations. For example, populations of raccoon, fox squirrel, wild turkey, and red-eyed vireo thrive in the forests while populations of bobwhite, ringtail cat, eastern cottontail, and fulvous harvest mouse thrive in the savannahs. Species common throughout the region include armadillo, coyote, peccary, and whitetail deer. Major fish include catfish, minnows, shiners, and various gamefish such as black bass, crappie, spotted bass, and sunfish.

Most of the species that exist in the region have proven to be somewhat compatible with man. Some species, however, are more adaptable to human habitation. They are, therefore, common in areas that border agricultural, natural resource, or community developments. Other species are more sensitive to human activity. Their populations have diminished to the point where they are rare or in danger of extinction. Federally listed endangered species of wildlife include the Houston toad, Mexican duck, whooping crane, peregrine falcon, bald eagle, red wolf, American alligator, and fountain darter. Presently, there is only one species of plant listed as endangered by the U.S. Fish and Wildlife Service. This is Texas wild rice. Numerous other plants are under consideration for designation as endangered. They may eventually be listed as threatened or endangered.

The ecosystems within the Texas Coal Region are not particularly fragile. The forests and savannahs can sustain a degree of disruption and eventually return to a natural state. This is presently being demonstrated in areas where there was earlier widespread clear-cutting of deciduous and coniferous forests. Within decades these lands became reforested through natural successions. Disturbed vegetation may take many years to mature to an oak-hickory climax forest similar to original virgin timber. Nevertheless, immature oak-hickory-pine associations can reoccur naturally within 50 years. Mesquite savannahs can regenerate even more quickly. Additionally the gently rolling topography is not overly vulnerable to erosion, although localized erosion problems exist, paricularly in the southwestern portion of the region. In summary, the ecosystem within the Texas Region could be reclaimed with proper management, should the surface be disturbed by coal mining.

4.4.2 The Environment and Man

The natural resources of the Texas Coal Region have historically attracted man. Prior to the European colonization of North America, the region supported Indian populations from the Caddo, Wichita, Tonkawa, Lipan, and Desert Tribes. Hunting was the main means of survival. Bison, deer, and smaller birds, mammals, and reptiles were primary food sources.

The land was not visited by Europeans until the sixteenth century. In 1542 a Spaniard named Mosoco, who had been a member of de Soto's party, entered the Texas Region from the northeast, proceeded southwesterly to about the center of the region, and then returned by the same route. Mosoco's exploration initiated Spanish colonization of the area.

Over the next three centuries Spanish colonists settled the area and missions and small farms were established. By the nineteenth century, the productivity of the land also proved attractive to the westward expanding states. English speaking people began migrating to the area. Conflicts resulted between the Spaniards from Mexico and the citizens of the United States. War eventually resulted with troops lead by Sam Houston and Santa Anna. The Mexicans were defeated, and the U.S. obtained possession of the land. After 10 years as an independent republic, Texas joined the Union in 1845.

By 1850, the northeastern half of the region had been settled by westward migrating pioneers. The area's flood plains were settled first because of their agricultural productivity and proximity to water. Timber and clay resources were more than adequate to supply all needs for construction materials. By 1890 cities and towns were scattered throughout the region. The region proved especially attractive to ranchers and farmers. The vast grasslands of the southwestern portion could readily support cattle or sheep, and extensive ranches were developed in this area. In the wooded

territory of the northeast, some of the land was cleared for pasture or the cultivation of cash crops. The central ecotone between the grassland and forestland (mesquite-oak savannah) supported both farming and ranching. Environmental conditions permitted the widespread cultivation of cotton in the northeastern central areas. Much of the land still supports cattle and sheep production and the cultivation of cotton and other cash crops. Currently, approximately 70,000 persons, or about 10 percent of the total regional work force are employed in the agricultural sector.

The vast stands of virgin timber in the northeast continue to be highly productive. Extensive lumbering operations began about 1880. The economics of the industry, at that time, required the harvesting of only large diameter trees. Within decades, however, construction material and paper demands grew with the population, and all timber stands became valuable. By 1930, all virgin timber stands had been harvested. Presently, timber demand still is high particularly for pulpwood production in the northeast; however, primarily second and some third generation timber is being harvested.

In addition to timber, numerous other resources were developed for use as twentieth century construction material. Clay for brick manufacturing is plentiful in the area. Ample sand and gravel supplies are available for use as cement for buildings or concrete for highways. Large deposits of iron ore are found throughout the northeastern portion. The ore is a low grade brown ore, but is being actively mined for use as a highway construction material.

Perhaps the most attractive natural resources within the Texas Coal Region are the energy minerals. In addition to lignite, oil and gas are abundant. Texas became the leading State in the country for production of both oil and gas. Much of these resources are produced within the boundaries of the Texas Coal Region. The region is presently producing more oil and gas than it consumes, and contributes significantly to the country's energy demands. The low grade lignite found within the region has not been economically competitive with oil and gas. Until recently, the higher grade bituminous and anthracite coals were of greater economic value to industry. Accordingly, no major development of the region's lignite deposits has occurred to date. Scattered localized development of lignite, however, is occurring for intraregional industrial use. Industries are, nevertheless, becoming interested in lignite development.

The demand for the region's numerous resources also created a demand for a transportation network with the capacity to accommodate the movement of bulk commodities, as well as people and their necessities. The entire region is crisscrossed by a diversified network of rail main lines and branch lines operated by the Missouri Pacific, Southern Pacific, St. Louis Southwestern, Atchison Topeka and Santa Fe, Louisana and Arkansas, Texas and Pacific, and Missouri-Kansas-Texas railways. The region's highway network is composed of numerous county, State, and Federal highways, all of which can lead eventually to access to the major Interstate Highways. The pipeline system is composed of oil and gas lines. No coal slurry pipelines are located in the region.

Natural resource development has led to dramatic socioeconomic changes for the region during the twentieth century. Table 4-6 presents pertinent socioeconomic data which provides information on the relative importance of specific sectors of the region's economy. In addition to rural development, community and urban growth has been inspired by resource-dependent industry. Industrial growth has been and still is a dynamic phenomenon in the region. Currently, approximately 150,000 workers, or about 17 percent of the total regional labor force, is in the manufacturing sector. Industrial growth concentrations include Tyler, Longview, Bryan, and San Antonio, Texas, and Shreveport, Louisiana. These cities are absorbing growth in a relatively organized manner.

The resource-oriented economic base of the region has brought prosperity to the Texas Coal Region. Surplus resources are exported, thereby resulting in an influx of revenues. Regional capital, together with an adequate labor pool, has been capable of supporting industrial development. They are available for continued resource development.

Cultural development within the Texas Coal Region provides the area with an interesting history. Indian artifacts can be found throughout the region. Historical sites from the Alamo to Lyndon Baines Johnson's boyhood home are located within its boundaries. Approximately 150 such sites are listed on the National Register of

TABLE 4-6

POPULATION AND ECONOMIC CHARACTERISTICS IN THE TEXAS REGION (a)

1975 Total Population[a]	2,526,616
Total Area (square miles)[a]	45,900
Population per square mile (1975)	55.1
Per Capita Personal Income (1975)	$4,398
Per Capita Personal Income as a Percent of National Average (1975)	87

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	28,613	3	126,314	2
Other Agriculture	52,818	6	167,179	2
Metal Mining	270	0-1	2,623	0-1
Coal Mining	672	0-1	3,149	0-1
Oil and Gas	14,191	2	231,256	3
Other Mining	1,657	0-1	5,099	0-1
Construction	52,274	6	533,911	7
All Manufacturing	149,330	17	1,471,359	18
Transportation, Communication, and Public Utilities	31,239	3	524,726	6
Wholesale and Retail Trade	182,096	20	1,381,368	17
Finance, Insurance, and Real Estate	35,398	4	349,263	4
Other Services	113,792	13	1,164,056	14
Federal Govt.	104,125	12	1,275,904	16
State and Local Govt.	130,791	15	914,083	11
TOTAL	897,266		8,150,290	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

Historic Places. The Chisholm and Old Cattle Trails, currently proposed for the National System of Trails, are being considered for protection and preservation.

The region's population growth and settlement patterns have been such that no surface land ownership is presently under the Bureau of Land Management's jurisdiction. The major Federal lands in the region are Camp Swift and the Sam Rayburn Reservoir and the Sommerville Reservoir, which are under the jurisdiction of the U.S. Department of Defense and portions of the Sabine, Davy Crockett, Sam Houston, and Angelino National Forests, which are under the jurisdiction of the U.S. Forest Service.

4.5 POWDER RIVER COAL REGION

The Powder River Coal Region is the southwest portion of the Northern Great Plains. The region encompasses about 31,300 square miles in eight Montana and eight Wyoming counties.

4.5.1 The Environment

The region is on a broad plain bordered by the Rocky Mountains on the west, the Black Hills uplift on the east, and the Missouri River on the north. The area is covered primarily with the thin stony deposits characteristic of a semi-arid area, with recent alluvial deposits and terrace gravels in the floodplains. These alluvial deposits of sand and silt with lenses of gravel usually occur in thicknesses up to 15 feet along the major rivers of the area and 10 to 15 feet along the tributaries.

Rocks are mostly sedimentary, and rest nearly horizontal except along the flanks of the Bighorn Mountains where they turn up sharply. The sedimentary rocks consist of several thousand feet of sandstone, shale, limestone, conglomerate, and beds of sub-bituminous coal. Some of these beds were deposited on the floors of ancient seas that extended across the continent; others were deposited in deltas or tidal areas along the margins of the seas or inland in broad basins. Coal formed in tidal swamps and marshes along the marine shores, and also in swamps and lakes on the flood plains of major drainage systems of inland basins which developed after the continents were uplifted and the seas retreated. Coal of commercial interest is contained in the Tongue River member of the Fort Union Formation and the overlying Wasatch Formation.

In general, the coal beds are thickest in the northern parts of the region and across the gently dipping northern and eastern sides of the Powder River basin in Wyoming. A large proportion of this coal lies in near-surface beds that are readily available to surface mining. The region contains approximately 142.5 billion tons of sub-bituminous coal resources.

The thickness of these beds is unsurpassed anywhere in the U.S. The Wyodak seam in the Wyoming portion of the basin is as much as 120 feet thick, and contains 212,400 tons of coal per acre within a few feet of the surface. In the central parts of the region, south of the Yellowstone River in Montana, there are several beds with equally abundant coal in near-surface seams.

In addition to coal, extensive deposits of oil and gas are found in the Wyoming portion of the region and in Montana around the Bull Mountains. Uranium is also found in the Wyoming portion. Underlying the entire Powder River Coal Region south of the Yellowstone is the Madison Group, which is considered the top part of the major aquifer of the basin. This aquifer dips very steeply off the flanks of the Bighorn Mountains to a point about 15,000 feet below the surface. The Madison Group rises gently from this point toward the Yellowstone River and the Black Hills where it outcrops. The Madison Group is about 200 feet thick near the south end of the basin and gradually thickens toward the Yellowstone where it is up to 1,400 feet thick.

The regional climate is continental and semi-arid. Frontal systems from the Pacific regularly cross the area, but have dropped most of their moisture on the western slopes of the Rocky Mountains. About a dozen times a year, winter storms from the north swing through the area, bringing windy and often intensely cold weather with rarely significant moisture. These cold waves are often modified by periods of milder weather created by "chinook" winds. These winds, warm and dry, frequently reach 25-50 mph and may persist for several days. Spring and summer bring some moisture; however, the area is considered dry.

The average annual temperature varies little throughout the area, with most points averaging 45°F. Maximum temperatures occur in July when 100°F temperatures are recorded. The arctic outbreaks in winter bring extreme cold in January

and February, with record lows in many areas of -50°F.

Seventy-five percent of the average annual precipitation of 14 inches falls between April and September. At least half occurs during late spring and early summer, at the start of the growing season. Despite the region's aridity, flooding is common in the spring when rapid snow melt produces heavy runoff.

Perhaps the most important climatic feature in shaping the region is the recurrence of drought cycles. Though this region is characterized as semi-arid, it varies from humid in some years to arid in others and is never predictable.

The region is windy, with average speeds of 12 mph. The prevailing direction is westerly, but directions near terrain features may vary considerably. Surface-based inversions occur on 75-85 percent of the mornings, summer and winter; and on winter afternoons, surface based inversions occur about 35 percent of the time. Stable conditions are prevalent in spite of generally windy conditions, and these circumstances contribute to the high summertime afternoon mixing heights.

Air quality in the region is generally good. Some variations do exist around populated areas and even more so in areas where coal surface mining is presently taking place. In Montana, the particulate air quality is very good except for the Colstrip area in Rosebud County and the Billings area in Yellowstone County. The Colstrip area, where surface mining and electric generation are taking place, is not meeting the primary standard for particulates. The Billings area is not meeting the secondary standard. Particulate air quality in the Wyoming counties is better than the national standards. However, in areas where substantial coal surface mining is taking place (such as Campbell and Converse counties in Wyoming), the air quality in the immediate area of the mine site may not be as good. Sulfur dioxide air quality is better than the national standard throughout the region, with the exception of Billings.

The major streams of the region are the Yellowstone, Big Horn, Powder, Tongue, Belle Fourche, and Musselshell Rivers. Surface reservoirs for regulation of streamflow have a combined capacity of about 2.5 million acre-feet. Surface water runoff is low, about half an inch per year. Potential evapotranspiration over most of the area is less than 24 inches a year, but in the Yellowstone River lowlands it rises to as much as 36 inches.

Surface water quality is variable. The Powder and Big Horn Rivers commonly carry concentrations of dissolved solids in excess of 1,000 mg/liter. Streams with heavy sediment load are the Powder and the Yellowstone, ranging from a low of about 270 mg/liter to a high 1,900 mg/liter. Over the remainder of the area, the sediment loads are variable and can exceed 1,900 mg/liter.

The occurrence of groundwater in the region is far from uniform. In Montana, there are large areas where shallow wells will yield only 2 to 4 gpm, but wells drilled into the bedrock aquifers, such as the Hell Creek and Fox Hills Formations (Cretaceous) or the Fort Union (Paleocene) may yield more than 50 gpm. Many wells drilled in the Powder River and Yellowstone River Valleys flow under artesian pressure, but lowering of artesian pressures sometimes necessitates pumping. Much of the southern and southeastern region is underlain by several thousand feet of non-productive shales. Groundwater can be produced at a rate of up to several hundred gpm from wells in permeable valley fills along major streams. The greatest development of these alluvial deposits is along the Yellowstone River and its tributaries.

The Madison Limestone Formation underlies the region at considerable depths, and is currently being tested by the U.S. Geological Survey as a potential source of water supply for the coal industry. Recent studies indicate that the water is chemically suitable, but the quantity available for withdrawal is unknown.

Groundwater quality is variable. Generally, at depths greater than 500 feet, all groundwater has more than 1,000 mg/liter of total dissolved solids. The amount of groundwater withdrawn in 1975 for consumptive uses was about 124,000 acre-feet, of which about 34,000 acre-feet was actually consumed. The largest use was for irrigation, and the second largest use for self-supplied industries.

Groundwater in storage is about 1.4 million acre-feet in the near-surface alluvial aquifer material. Estimated reserves from the deep Madison limestone, however, are unknown, although estimates range up to over one billion acre-feet.

Topographically, the region can be divided into three general areas: the Powder River drainage in Wyoming, the Tongue River drainage in Montana, and the area north of the Yellowstone

River. The Wyoming area drained by the Powder River has gently undulating topography with clay and loam soils that have a large amount of sodium in the clays. These soils are dry much of the year and their relative productivity is poor. Exceptions are the locally important and more productive soils associated with flood plains of the Powder River, Little Powder River, and lesser tributaries. These flood plains with alluvial soils are often broadly terraced and have high water tables. Typical flood plain vegetation includes cottonwood, willow, green ash, boxelder, chokecherry, greasewood, salt grass, and western wheatgrass. Wildlife ranging over many miles of the adjacent plains rely on these flood plains for critical resource needs.

The remainder of the Wyoming portion of the region can be generally classed short-grass prairie, grassland-sagebrush, and sagebrush steppe. These vegetation types may seem monotonous and unproductive. They are, however, a complex assemblage of plants that are well adapted to the extremes of weather which occur in the area. Lying dormant during periods of drought, they are capable of quick response to precipitation, producing significant quantities of foliage of high nutrient value. Besides the common grasses and sagebrush, there is an abundance of forbs that increase the species diversity and resilience of the vegetative community, which in turn supports a diverse assemblage of animals.

North of the Wyoming border in the Tongue River basin and the lower reaches of the Powder River there is a change in topography and an associated change in soils, vegetation, and wildlife. The dominant soil in the Tongue River basin is loam with fair to very good productivity. The area is highly dissected by numerous small drainages dominated by two major vegetation types, grassland-sagebrush and ponderosa pine. The ponderosa pine type occurs on uplands, ridges, and north slopes that have shallow loam soils. Prominent species of plants are ponderosa pine, snowberry bluegrasses, fescues, and June grass.

North of the Yellowstone, the Powder River Coal Region is dominated by soil types not found south of the river. The undulating to hilly land has shallow to moderately deep loamy soils that are nearly always dry and hence have low productivity. These lands are vegetated by the mid-to-short-grass prairie type, characterized by such species as western wheatgrass, needle-and-thread grass, and blue grama grass. On the northern border of the region along the Missouri River are the "Breaks", highly dissected land forms similar to the Badlands in North and South Dakota.

In general, the region can be considered part of the short-grass prairie. The high annual turnover of net primary production in its grasslands and sagebrush steppe communities provides a food base for a wide variety of mammals. Grazing animals, burrowing mammals, and ground-nesting birds are characteristic of the grasslands. Insect life is abundant, varied, and heavily utilized as food for many secondary consumers. Sagebrush is prominent in the vegetation composition in parts of the grassland, especially in the southern part of the region, and is important to pronghorn antelope and Brewer's sparrows and virtually essential to sage grouse. Large herbivores such as bison and antelope were present in great number during presettlement times. Today, bison have been replaced as the primary grazing animals by domestic livestock as horses, cattle, and sheep often compete with herbivores.

Practices used in livestock production have sometimes disrupted the grassland ecosystem to the detriment of various wildlife species. Examples are predator and rodent control programs and sagebrush eradication in antelope or sage grouse wintering areas. Antelope are still numerous in the grasslands; investigations have shown that they are highly dependent on the brush and forb components of the grassland for survival. Typical smaller mammals include the masked shrew, white-tailed jackrabbit (northwest), black-tailed jackrabbit (southeast), desert cottontail, black-tailed prairie dog, northern pocket gopher, the plains pocket gopher (south), coyote, long-tail weasel, badger, and prairie spotted skunk. Reptiles include the prairie rattlesnake and eastern short-horned lizard. Birds include the ferruginous hawk, sharp-tailed grouse, mountain plover, burrowing owl, horned lark, western meadowlark, lark bunting, savannah sparrow, grasshopper sparrow, vesper sparrow, and McCown's longspur. Drought and severe winter storms occur periodically, and some animal populations can fluctuate widely from year to year.

In the ecotone area between the montane coniferous forest and the grasslands, animal species characteristic of the coniferous forest and of the forest edge will often be found. Some of these animals, such as mule deer and elk, also

occur in extensions or scattered islands of coniferous forest and related subtypes within the grassland. Typical mammals of the coniferous forest and forest edge include the golden-mantled ground squirrel, least chipmunk, red squirrel, bushy-tailed wood rat, boreal redback vole, porcupine, mule deer, elk, and bobcat. Birds include the golden eagle, Clark's nutcracker, mountain chickadee, mountain bluebird, and pygmy nuthatch.

The deciduous forest edge extends into the shortgrass plains along stream drainages. As the interior of the continent grew arid in prehistoric times, many species of deciduous trees together with their associated animals were able to persist along the stream. These tongues of forest greatly extend the forest edge, increasing the number of species that can live in the grasslands. Some species are common to the deciduous forest edge over most of its range, and others are found only in the western portion of this type. Typical mammals in these areas include the fox squirrel, eastern cottontail, whitetail deer, red fox, striped skunk, and raccoon. Reptiles include the blue racer, milk snake, and red-spotted garter snake. Birds include the turkey vulture, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, Swainson's hawk, mourning dove, common nighthawk, red-shafted flicker, violet-green swallow, common crow, black-billed magpie, loggerhead shrike, and Brewer's blackbird.

Aquatic wildlife includes a variety of invertebrates, fishes, birds, mammals, reptiles, and amphibians associated with the stream, lake, and pond-marsh communities. Typical inhabitants of stream riffles and sand-bottom pools are caddisfly larvae, mayfly naiads, stonefly naiads, crayfish, and snails. Characteristic species include the longnose dace, flathead chub, goldeye, river carpsucker, black bullhead, channel catfish, stonecat, plains topminnow, plains killfish, and white sucker. Rainbow and brown trout are found in suitable larger streams. Other stream-associated wildlife include the tiger salamander, plains spadefoot toad, great plains toad, leopard frog, and snapping turtle. Muskrats use burrows in stream banks and feed on streamside vegetation. Beaver feed on the aspen, willow, and cottonwoods along stream courses and in some localities build dams creating pools.

Species characteristic of the few lakes in the region include yellow perch, largemouth bass, black crappie, and carp. In deeper, cooler lakes rainbow trout are often planted and maintained by man. A number of birds commonly inhabit the lakes and subsist mainly on fish. Common mergansers, California gulls, bald eagles, white pelicans, and osprey are among them. Swallows consume great numbers of emerging midges and other insects.

Wildlife species in this region that are classified as endangered are the black-footed ferret, whooping crane, bald eagle, and American peregrine falcon. Some species, while not endangered throughout their range, have remnant populations in danger of being eliminated in local areas. This has prompted some states to develop "rare and endangered" species lists. Wyoming's list includes such species as the shovelnose sturgeon, sturgeon chub, kit fox, upland plover, and western smooth green snake, all of which occur within this region. There are no plant species currently listed as endangered or threatened; however, some species found in this region currently are being considered for inclusion.

4.5.2 The Environment and Man

The earlier dwellers of the plains are believed to have been the Paleo Indians of the Big-Game Hunting Tradition.

Although not well documented within this region, the Paleo-Indian big game hunting tradition of the pre-8000 B.C. period can be characterized by sites such as Brewster and Hell Gap immediately to the east and southeast of the region. The Hell Gap site in Niobrara County, Wyoming, produced evidence of several occupation levels to approximately 9000 B.C. This region is in the transition area from the Eastern Archaic to the western Desert Culture, occupied in the pre-1000 B.C. period by the Middle Prehistoric cultural complex. The final cultural development produced the Plains Bison Hunter complex that was ancestral to the tribal groups encountered by early European explorers. The most common evidence are the piles of buffalo bones found at the base of small cliffs. The area is rich in archeological resources but remains largely uninvestigated with no major systematic program having been undertaken. Most identified sites were found by accident or were attempts to salvage sites being developed for mining, industrial, or urban uses.

The first non-Indians to enter the region were seeking beaver. Men like Jim Bridger and Will

Sublette came into the land as explorers and trappers and became trail blazers who led pioneers across the great American Desert to the California gold fields and the lush Willamette Valley in Oregon Territory. Most of the early pioneers passed through the region believing that it was unsuitable for their agrarian culture. Settlers headed for California and Oregon passed through during this period. The gold rush to California started in 1849 and persisted until 1870. The Montana gold strike was in 1865 and it attracted more people through the area.

The influence of the non-Indian culture in the plains grew rapidly. The development of the telegraph, railroads, cattle drives, and the passage of the first Homestead Act in 1862 began the process which eliminated the vast buffalo herds. Two tribes, the Crow and Northern Cheyenne, occupied the region beginning in the 17th Century. Both tribes were a mobile society depending on the buffalo for a significant part of their consumptive needs. Both tribes signed the Friendship Treaty of 1825 and the Ft. Laramie Treaty of 1851, both of which were violated by non-Indians. These violations led to conflict. The most famous of this period is the 1876 Battle of the Little Big Horn where General Custer and his troops were killed. Many historic remnants of this period have been preserved. In addition to the Custer Battlefield, there are many U.S. Army Forts still found in the area.

The Northern Cheyenne and Crow were unsuccessful in their attempts to retain the lands granted to them in the earlier treaties and eventually agreed to move onto their present reservations. The Northern Cheyenne Tongue River Reservation, consisting of 371,200 acres, was established in 1884. The name of this reservation has been changed to the Northern Cheyenne Indian reservation and has been expanded by Tribal land purchases to 444,308 acres.

The treaty of Ft. Laramie granted the Crows a hunting reservation of 38,883,174 acres in Montana and Wyoming. In 1868 the Federal Government reduced this to 9 million acres which lie primarily in Big Horn County, Montana. Sales by the Crows and further reductions by the U.S. Government reduced the Crow reservation to 1,569,288 acres.

Stock raising in the Powder River Coal Region became a booming business which grew rapidly between the civil war and the 1880's. At first it was based on a free open range with the only constraint being the number of head a group could put together and the availability of stock water. The scarcity of water was immediately evident. Development of springs, small retention dams on intermittent streams, and the windmill are still the critical links in the chain that makes the region's grazing lands useful. Conflicts over the use of western water continue to this day even at the national level.

In the early days of ranching most cattle were left on the range year round. Although winter feed was limited, most cattle survived and reproduced in sufficient numbers to maintain a viable economy. Records show that the period from the end of the civil war until the end of the 1880's was a period of unusually high precipitation. The condition of the range and the availability of winter forage were significantly higher than could be normally expected. However, in the late 1880's, particularly the winter of 1886-87, the growing cattle empires suffered devastating losses. Severe cold and high winds killed hundreds of thousands of animals.

Cattlemen partially addressed this problem by insuring a good supply of winter feed. They accomplished this by converting bottomlands to irrigated hay meadows, the mainstay of the industry yet today. Simple one-man stream diversions grew to cooperative efforts between neighbors to large ditch companies that not only built and maintain diversion and delivery facilities but also reservoirs to store the spring runoff for use during the summer and late fall. By the 1890's irrigation systems could be found in most of the areas where their development was practical and economical. The opportunity to develop irrigated haylands was not as available in the southern part of the region. Therefore, many ranchers in this region still depend on the range for winter feed often supplemented by hay purchased from other areas.

The cattle industry of today is essentially the same as it was at the turn of the century. The ranches as they now exist in the area are large. Average size for Campbell and Converse Counties, Wyoming, is over 7,000 acres. Most of these ranches are self-contained, but some ranchers move cattle and sheep from their base ranches to summer ranges on public lands located some

distance away. Most units utilize some state or Federally owned surface rights. Machinery has replaced much of the hand labor; smaller outfits have been absorbed by larger ones; and local owners have in some instances been bought out by corporations. For those people on the land their life is much the same as those of their grandfathers and grandmothers who settled the land. Hay is irrigated and cut and stacked in the summer and fall. Cattle are rounded up in the fall, fed on the home place over winter, and transferred to the range for the summer where they feed and grow on native vegetation.

Many of the settlers who began to enter the region after the turn of the century came to farm. As a result, much of the land in the region has been used to produce dryland crops, particularly wheat. However, the soils and the rainfall are marginal at best and, except for those farms that are irrigated, like those along the Yellowstone River. A cycle of boom and bust has been the rule. During periods of drought, wind erosion starts and tons of soil, developed over thousands of years, are lost in a matter of days.

The last few decades have shown a variability in amount of dryland farming, crop yields, and crop failures. During the 1920's, drought drove many homesteaders off the land. The Federal Government, operating under the National Industrial Recovery Act of 1933, Emergency Relief Act of 1935, and the Bankhead Jones Act of 1937, reacquired many of these eroded lands and replanted them with forage plants. Some of these lands have been included in the Thunder Basin National Grasslands in the southern part of the region.

Many of the above described events are being preserved for posterity's sake by historic designations. Sheridan and Johnson Counties alone, for example, contain more than 65 historic sites eligible for or enrolled in the National Register of Historic Places.

Although ranching and farming are the life style, and constitute the economic activity generally associated with the region, the exploitation of oil, gas, and uranium have made significant economic contributions, particularly in the Wyoming portion of the region. Table 4-7 presents an overview of comparative data for the various sectors of the region's economy.

Oil and/or natural gas have been discovered in more than 200 fields within the Wyoming portion of the region, and active exploration continues. Most of the fields produce from either the Muddy Sandstone of Cretaceous age or the Minnelusa Formation of Pennsylvanian age. The Cloverly Formation of early Cretaceous age is also an important producing horizon and lesser amounts of oil and/or natural gas come from Sundance, Morrison, Mowry, Turner, Niobrara, Shannon, Sussex, Parkman, Ferguson, and Teapot Sandstones.

From the first significant oil discovery at Big Muddy Field in 1916 until January 1, 1973, production has been more than 400 million barrels of oil and about 400 billion cubic feet of gas. The remaining recoverable reserves in the region are conservatively estimated at more than 200 million barrels of oil and more than 500 billion cubic feet of natural gas.

Of the known fields, 66 are actively producing and 44 are classified as temporarily nonproductive. A majority of the nonproductive fields are shut in, waiting for secondary or tertiary recovery procedures or reactivation to be implemented.

The average area used by oil well facilities including pumper, separator, ponds, pipelines, and access roads, does not exceed 15 acres per square mile. Where several wells share land facilities or are developed with spacing, the area required is less than 5 acres per square mile.

Uranium ore occurs in two mining districts in the Wyoming portion of the region: the Pumpkin Buttes district in Campbell, Converse, and Johnson Counties, and the Southern Powder River Basin district in Converse County. Host rocks for uranium ore in the Pumpkin Buttes district are sandstones in the Wasatch Formation. In the Southern Powder River Basin district the ore occurs in sandstone in the upper part of the Fort Union Formation and in the sandstones in the Wasatch Formation.

The uranium industry of Wyoming began in the Pumpkin Buttes district with the discovery of ore-grade uranium in 1951, and the first commercial production began in 1953. Early mining was for high-grade deposits at or near the surface, from pits generally less than 100 feet deep and less than 5 acres in extent. Between the years 1953 and 1967, 36,737 tons of ore containing 208,143 pounds of uranium were mined from 55 mines in Campbell

TABLE 4-7

POPULATION AND ECONOMIC CHARACTERISTICS IN THE POWDER RIVER REGION (a)

1975 Total Population[a]	228,418
Total Area (square miles)[a]	49,424
Population per square mile (1975)	4.6
Per Capita Personal Income (1975)	$5,648
Per Capita Personal Income as a Percent of National Average (1975)	111

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	6,175	7	49,958	5
Other Agriculture	2,606	3	36,911	4
Metal Mining	246	0-1	4,081	0-1
Coal Mining	590	1	13,013	1
Oil and Gas	3,385	4	79,644	8
Other Mining	636	1	4,380	0-1
Construction	5,145	6	104,924	10
All Manufacturing	6,379	7	103,766	10
Transportation, Communication, and Public Utilities	4,422	5	117,568	11
Wholesale and Retail Trade	22,541	26	188,883	18
Finance, Insurance, and Real Estate	3,058	4	35,714	3
Other Services	13,105	15	143,799	14
Federal Govt.	3,713	4	49,145	5
State and Local Govt.	14,314	17	106,469	10
TOTAL	86,315		1,038,255	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

County. By the late 1960's accelerated exploratory activity resulted in discovery of significant ore bodies in the Southern Powder River Basin district.

Uranium is not presently being mined in the Pumpkin Buttes district, but three mines are producing in the Southern Powder River Basin district from open pits. One company has begun development of underground mines.

The Powder River Region is surrounded by recreational resources of unique national significance. The Black Hills, Teton Park, the Bridger Wilderness, the Dakota Badlands, and Yellowstone Park annually attract millions of people. These tourists frequently travel through the Powder River Coal Region and experience its natural resources. Its primary attributes are clean air, open vistas and a kind of solitude not found in many areas. The region is sparsely populated; population density is about 5 people per square mile. Many of these are concentrated in major trade centers like Billings, Sheridan, Gillette and Casper. The low population levels enhance the quality of the recreational activities of camping, fishing, and hunting. Many farmers and ranchers become guides and this kind of part-time tourist industry has had small but important economic benefits to ranchers. The major economic benefits, however, accrue to the motel and restaurant operators who provide services to the tourists as they pass through the region to the parks and forests on the edges of region.

The lifestyle of the area is clearly western; cowboy boots, pick-up trucks, and big hats are the practical symbols of this lifestyle. As the rest of the nation is characterized by the mobility of the people, this area's common attribute is the stability of large segments of the population. A ranch, drug store, or farm equipment dealership may have been operated by the same family for several generations.

Overall population growth has been very slow during the last several decades. There have been local booms in towns like Gillette and Sheridan and some counties have experienced population losses, but overall the population can be considered stable. The influx of oil and gas developers has disrupted this stability in certain local areas, such as Gillette in the late 1960's and early 1970's, but the net regional effect has been relatively minor.

In recent years, coal and uranium developments have begun to accelerate. These types of development activities are much more extensive. They require more people, more land, and more water. New mines have opened around Gillette and increased its population. In addition to coal mining, coal conversion plants are being built, like those at Colstrip, Montana. With this kind of population influx the stability of the old structure is being radically changed.

Control of the political and economic system is shifting from the rural citizens to the new urban population. Many new private and public facilities are being constructed, increasing the opportunities and services available, but for the established residents of the area they are different and they are controlled by a new establishment. Regional development has occurred in such a manner that most of the land is in Federal ownership, with the Bureau of Land Management and the U.S. Forest Service being the primary administering agencies. Within Federal land areas, some state and private lands occur. Of particular interest are the tracts of alternating private and Federal lands (interspered with some state-owned sections), which create a checkerboard pattern of land ownership. These are scattered in various locations throughout the region.

4.6 GREEN RIVER - HAMS FORK COAL REGION

The Green River - Hams Fork Coal Region is in the Middle Rocky Mountain Province of the western United States. This region encompasses approximately 37,500 square miles in five Colorado, 12 Wyoming, five Idaho and three Utah counties.

4.6.1 The Environment

The Green River-Hams Fork Coal Region is part of the Middle Rocky Mountain province, characterized by complex mountains with many inter-mountain basins and plains. The area is a series of parallel mountain ranges and valleys. Local relief may be as much as 2,000 feet, but is more commonly less than 1,000 feet.

The Green River subregion encompasses an area of about 17,000 square miles in southwestern Wyoming and northern Colorado, and includes several separate structural units. The Green River basin occupies the western section, separated from

the Great Divide basin to the east by the large Rock Springs anticline. Coal-bearing rocks here are the Mesaverde group, including the Rock Springs and the Lance Formations; the Fort Union Formation; and the Wasatch Formation. In the Colorado portion of the field, the Iles and Williams Fork Formations contain the Mesaverde Group coal beds. The coal-bearing section of rocks is several thousand feet thick and is composed mainly of sandstone with beds of siltstone, shale, and coal.

Coal beds range in thickness from a few inches to 42 feet and rank from sub-bituminous C to high-volatile bituminous C, with coals of higher rank occurring locally in areas of igneous intrusives and intense structural deformation. In past years, the high quality coals of the Mesaverde Group have been the most extensively mined and the most important in the area. Coal beds in most parts of the region are deeply buried and may never be of economic potential.

A total of 130 coal beds has been mapped in the coal-bearing Mesaverde and Medicine Bow Formations, the Ferris Formation, and the Hanna Formation. The beds are sub-bituminous C to high-volatile bituminous C in rank. They range in thicknesses from 8 feet in discontinuous beds in the lower formations to 35 feet in the Hanna Formation. The Hanna Basin area is characterized by rugged surface features. The Rock Creek coal field adjoins the Hanna Basin field on the southeast and contains coal beds ranging in thicknesses of 9.5 feet in the Hanna Formation and 8 feet in the Mesaverde Formation. Large areas of the surface are covered with gravel, and the coal-bearing rocks are difficult to trace.

The Hams-Fork portion of the region is in the extreme western part of Wyoming and includes small parts of Utah. The coal-bearing rocks crop out in long narrow belts extending from the mountainous region in the north to the less rugged southern region near the Utah-Wyoming border. The area lies in the highly complex Wyoming overthrust belt, an area of current interest for its high potential for oil and gas development. The coal-bearing formations exposed in the region are the Bear River Frontier, Adaville, and the Evanston. The Frontier Formation, the main coal-bearing unit, forms north-trending outcrop bands generally less than two miles in length.

The coal beds in the Hams Fork portion range in rank from high volatile bituminous A in the Frontier coals to sub-bituminous B in the Adaville Formation. Thicknesses greater than 100 feet are reported for coal beds in the Adaville Formation. The higher quality Frontier coals attain thicknesses as great as 20 feet. The steep dips make mining difficult in most parts of the region. The total coal reserve base is estimated to be 15.5 billion tons.

Coal is presently produced in several counties in this region, but is the leading mineral commodity in only three of these counties. Other important commodities include oil, gas, phosphate rock, stone, cement, vanadium, and trona (sodium carbonate). Sweetwater County, Wyoming, is the nation's principal source of trona. In addition, the area is endowed with paleontological and archaeological remains.

Of major geological interest in the region are the Como Bluff Fossil Area and the Petrified Fish Cut, areas of dinosaur and fish fossils, respectively. The Como Bluff Fossil Area is located in the northeastern section of the region, on the boundary line between Carbon and Albany Counties, Wyoming. This designated natural landmark is the site of the famous "Dinosaur Graveyard", where paleontological excavations since the 1870's have uncovered a great number of dinosaurs of various types. In the Kemmerer area of Lincoln County, Wyoming, the famous Petrified Fish Cut was discovered when the Union Pacific Railroad cut through the shale hills west of Green River in the late 1860's. Middle Eocene fish fossils from this area are in museum collections throughout the world. Principal fossiliferous formations in the region which contain paleontological resources are the North Park, Bridges, Green River, Hanna, Ferris, Fort Chrion, Lance, Lewis, Almond, Rock Springs, and Morrison.

The region has a primarily continental climate. Fronts generally originate in the Pacific and deposit moisture in the mountains as wind currents pass over increased elevations. Average annual precipitation is more evenly distributed in the mountains than in the basin areas. General flooding potential is low, although flash floods do result from intense summer thunderstorms. Evaporation potential far exceeds the total precipitation usually received.

The average annual temperatures range from 37°F to 46°F, with variations due mostly to differences in elevation and exposure. Growing seasons range from 28 days at Steamboat Springs, Colorado, to 130 days at Rawlins, Wyoming.

Prevailing winds for most of the area are generally out of the southwest. Most of the harsh winter storms are out of the northwest. The wind patterns are typically funneled through some of the mountain passes and canyons. The winter winds out of the north typically bring cold dry air with velocities sometimes exceeding 40 mph. Wind directions change regularly, and tend to be less persistent in any one direction than in many other portions of the U.S. The region has surface-based inversions on 85 percent of the mornings, during both summer and winter. They tend to be intense, but not particularly deep.

Overall regional air quality is very good. Areas not meeting the national standard for particulates are Craig, Colorado and the trona industrial area of Sweetwater County, Wyoming. The entire region is better than the standard for sulfur dioxide air quality.

Major drainage basins in the region are the Green and Yampa Rivers. Average annual runoff varies from less than 1 inch to over 30 inches in some of the high mountains. Many of the large streams in the area are perennial, obtaining most of their runoff from the higher mountainous areas; however, most of the tributaries originating in the lower area are intermittent. The region is vulnerable to droughts.

The quality of surface waters in the region ranges from good in the higher elevations to poor in the lower elevations. During low-flow periods many tributary streams have over 1,000 milligrams per liter of dissolved solids. The suspended-sediment content of surface waters is generally high, and during high flows exceeds 30,000 parts per million in many tributaries.

The average annual stream flow in the Green River Basin is 5.26 million acre-feet. Fontenelle and Flaming Gorge reservoirs are the largest in the region, storing about 4.3 million acre-feet. Such stored water is used to satisfy current water rights. About 2.5 million acre-feet of surface water is withdrawn per year, of which about 1.1 million acre-feet is consumptively used, primarily for irrigation.

Groundwater is found in the aquifers of alluvial deposits and bedrock strata. Alluvial deposits are good aquifers and are capable of yielding moderate amounts of groundwater. Pumping from alluvial aquifers is restricted in some States because of effects on appropriated water rights or nearby stream flow. Water in the alluvium aquifers has generally acceptable quality for most uses, but in some areas is highly mineralized.

Yields of most sandstone aquifers are low to moderate, while the highly variable limestone aquifers may yield up to 1,000 gallons per minute in wells. In general, where the aquifers are highly permeable, good quality water is obtained to depths of 1,000 feet or more. However, where the aquifers have low permeability, highly mineralized water is obtained even at shallow depths. Water quality throughout the region has not been fully explored.

The most common soils throughout this region have a sandy loam, loam, or silty surface and a calcium carbonate accumulation at depths usually greater than four feet. Permeability is moderate to low and, due to climate conditions, these soils seldom retain moisture for three consecutive months. Shallow, poorly developed soils consisting mainly of rock fragments occur along the mountains of the region. Dominant soil limitations of the region are shallowness, erosion, stoniness, and salinity.

The Green River-Hams Fork Coal Region is part of the cold desert biome, and is comprised primarily of sagebrush or saltbush-greasewood dominated communities. Other communities of local importance include mountain shrub, evergreen, and broadleaf forest, and barren areas. Approximately 24 percent of the total regional land area is forest.

The sagebrush community is composed of a mixture of low-growing shrubs dominated by sagebrush with a variable understory of perennial grasses and forbs. Understory vegetation includes bluebunch wheatgrass, thick wheatgrass, Indian ricegrass, prairie junegrass, cheatgrass, brome, lupines, rabbitbrushes, broom snakeweed, and goldenweeds.

Where the salt content of the soil is relatively high, sagebrush dominated communities are replaced by saltbush-greasewood associations. Dominant species are Nuttal saltbush, shadscale salt-

bush, fourwing saltbush, and black greasewood. Associated understory includes Alkali sacaton, bottlebrush, squirreltail, and thickspike wheatgrass, in addition to many of the same understory species of the sagebrush community.

Shrub communities of the higher elevation are dominated by serviceberry-snowberry-mahogany associations with understories that include thickspike wheatgrass, prairie junegrass, bluegrasses, western yarrow, asters, and milkvetch. On well drained, poorly developed, shallow, gravelly soils, shrub woodlands, dominated by rocky mountain and Utah juniper, predominate. Associated species include big sagebrush, low sagebrush, rabbitbrushes, mountain mahogany, prickly pear, and a variety of grasses, phloxes, and goldenweeds.

Depending upon slope, aspect, and elevation, forested mountain areas may contain associations of pinyon-juniper, spruce-Douglas fir, ponderosa pine-lodgepole, or a mixture of evergreen-aspen. Understory species include snowberries, blueberries, mountain mahogany, pine readgrass, lupines, mountain brome, and various grasses. Broadleaf forest, consisting principally of willow and cottonwood with grass understories, are limited primarily to floodplains along perennial streams. Barren areas associated with rock outcrops have a limited vegetation cover provided by mountain mahogany, serviceberry, wild buckwheats, big sagebrush, saltbushes, and prairie junegrasses

Primary productivity estimates for the major vegetative communities of the region range from about 1.8 tons per acre per year for sagebrush to approximately 5.4 tons per year for forested areas.

The region has 53 species of mammals including big game such as elk, mule deer, pronghorn antelope, moose, and Rocky Mountain bighorn sheep; and small game and non-game species such as whitetail jackrabbit, red squirrel, whitetailed prairie dog, longtail weasel, badger, coyote, and red fox. Twenty percent of the world's pronghorn antelope population and a major portion of the world's sage grouse population may be found within the sagebrush-grassland areas of this region. These areas also provide critical winter habitat for elk and mule deer, particularly in the northern section of the region. In addition to these mammals, the sagebrush biome is a winter concentration area for golden and bald eagles.

Species found in the conifer-aspen forest include the Canada lynx, snowshoe rabbit, red squirrel, porcupine, and the great horned owl. The Shiras moose occurs in the conifer-aspen forest and along the willow-dominated river bottoms. Rocky Mountain bighorn sheep prefer higher elevations where the coniferous forests are broken by alpine openings.

In the woodland-bushland communities, mule deer, mountain lion, and coyote commonly occur in the woodlands during the fall, winter, and spring and range into adjacent habitats during summer. Rocky hillsides and cliffs within the woodland-bushland community provide habitat for the bobcat, rock squirrel, cliff chipmunk, desert and bushytailed woodrats, and pinyon mouse. Common birds of the woodland area include pinyon and scrub jay and bandtailed pigeon. Rattlesnakes, lizards, and horned toads may invade from adjacent desert areas, but are not particularly characteristic of woodland communities.

A number of game and non-game fish species are typical of the region's waterways. Principal game fish native to the region include mountain whitefish and cutthroat trout. Fish introduced into some lakes of the region include largemouth bass, smallmouth bass, and crappie. Non-game species found in the region include speckled dace, mountain sucker, Utah chub, redsided shiner, and longnose dace. Pond-marsh biotic communities are limited in extent, but have local significance. The most widespread type of aquatic or semi-aquatic situation is provided by beaver ponds which are numerous on small mountain streams throughout the region. Also found in the pond marsh communities are mallards, pintails, teal, Barrow's golden eye, Great Basin Canada goose, marsh hawk, bald eagle, and osprey.

In the region one species of fish (the Kendall Warm Springs dace), three species of birds (the peregrine falcon, bald eagle, and whooping crane), and two species of mammals (the black-footed ferret and Rocky Mountain wolf) are presently officially listed as endangered species. There are no endangered plants listed for the region, although 18 species are proposed for such listing.

Wild horses are found in several parts of the region. Herds of approximately 4,500 are estimated to exist in Wyoming and in northwestern Colorado, and are estimated to increase between 15 percent and 30 percent annually.

The potential for reclamation of disturbed areas varies considerably within the region. By

using the best available technology for reclamation, many of the limitations of soil and precipitation can probably be overcome. Each specific location for disturbance will require separate evaluation.

4.6.2 The Environment and Man

The earliest cultural traditions of this region were divided between big-game hunting in the eastern half of the region and gathering and hunting activities of the desert. During later periods, the entire region was under the influence of the Desert Culture, which persisted with little basic change up to the end of the historic period. The Desert Culture was predominated by hunter-gatherers who inhabited caves from about 9,000 B.C. to 4,000 B.C.

Astorians returning to St. Louis passed through the northern part of this region in 1812, but it was not until the mid-1820's that this area was extensively traveled. This was the era of the American fur traders, the mountain men who opened up the area of the central Rockies. Jedediah Smith in 1824 rediscovered the South Pass through the Rockies which was later used by thousands of immigrants heading for Oregon and California. By 1835, the Oregon Trail was well established and the reconnaissance work of Fremont and other Army explorers helped to map the land west of South Pass. The Union Pacific Railroad was built across southern Wyoming in 1868-1869. By 1890, one-fourth of the area was settled, and the Pony Express, the Overland Stage, and the railroad had established routes through the area.

There are approximately 50 listings from this region in the National Register of Historic Places, including stage line stations, Army forts, Oregon Trail sites, and a variety of buildings and historic districts.

Today, the region is still typically western with a low population covering vast areas of public lands and large ranches. The primary source of employment in the region is wholesale and retail trade. The construction industry accounts for five percent of the employment. Agricultural employment in the region is 10 percent, and mining and mineral industry in the region is 12 percent of the employment. The Government employs 23 percent of the workforce. Table 4-8 shows a breakdown by each economic sector for employment and earnings.

While agriculture is not large in terms of the number of people employed or the total income, it is the most visible activity throughout the region. The agricultural economy has developed in the area since the 1800's and continues to play a major role. To some extent, farming and, to a large extent, grazing of domestic livestock persist throughout the region. Farming is limited by rainfall and temperature. Cattle and sheep ranching are the leading agricultural activities.

This region has an array of recreational resources. Parts of Rocky Mountain National Park, the Mt. Zirkal and Rawah Wilderness areas, and the Denver and Rio Preservation Areas within Routt and Roosevelt National Forests, are located within the region. Five National Wildlife Refuges (National Elk Refuge, Seedskadee, Pamforth, Hutton Lake, and Arapahoe) with a combined area of approximately 37,600 acres, are also located here. The Fossil Butte National Monument in Wyoming is in the area. The Mormon, Oregon, and Continental Divide Trails are under consideration for the National System of Trails. Three state recreational areas, three state parks, and twelve state historical sites are in the region. These facilities have a total area of over 76,200 acres and have an annual attendance of more than 693,000. Camping, fishing, and hunting are the most popular recreational activities.

Counties in the region are characterized by sparse population with densities of about 2.6 persons per square mile. The total population is approximately 126,900. The decade of the 1960's recorded high rates of out-migration ranging from 8 to 34 percent. This trend reversed, however, between 1970 and 1976 when over 33,000 persons in-migrated. Population and general economic data are shown on Table 4.8.

Major transportation in the Colorado section of the region is provided by the east-west Denver and Rio Grande Western railroad. The southern Wyoming region is served by Interstate 80 and by the Union Pacific railroad. There are many other paved highways and unpaved roads existing throughout the region which provide access into the major areas of economic development.

Adequate housing is in short supply, especially in the larger communities such as Craig, Colorado, and Rock Springs, Green River, and Rawlins,

TABLE 4-8

POPULATION AND ECONOMIC CHARACTERISTICS IN THE GREEN RIVER-HAMS FORK REGION (a)

1975 Total Population[a]	126,938
Total Area (square miles)[a]	48,764
Population per square mile (1975)	2.6
Per Capita Personal Income (1975)	$5,475
Per Capita Personal Income as a Percent of National Average (1975)	108

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	3,590	7	26,118	5
Other Agriculture	1,310	3	10,863	2
Metal Mining	566	1	8,279	2
Coal Mining	1,122	2	24,324	5
Oil and Gas	3,911	8	66,201	13
Other Mining	371	1	1,994	0-1
Construction	2,616	5	50,669	10
All Manufacturing	2,001	4	18,972	4
Transportation, Communication, and Public Utilities	2,079	4	45,344	9
Wholesale and Retail Trade	10,318	21	82,464	16
Finance, Insurance, and Real Estate	1,737	4	17,179	3
Other Services	7,776	16	74,392	14
Federal Govt.	1,589	3	20,351	4
State and Local Govt.	9,771	20	69,603	13
TOTAL	48,757		516,753	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

Wyoming. Many smaller communities within the region such as Meeker, Colorado, are experiencing housing problems. The number of mobile homes and mobile home parks has increased in many communities. Increased population in many communities has also produced increased school enrollments, resulting in overcrowded classrooms in understaffed schools.

Health care facilities are generally adequate for the region, although some areas are experiencing a shortage of physicians. Mental health care facilities, where they exist within the region, are receiving a disproportionate number of cases from energy related rapid growth. Fire protection service is generally provided by the volunteer departments, and only Rawlins, Sinclair, Rock Springs, Green River, and Evanston, Wyoming, have fire insurance ratings which are considered adequate. Expansion of water and sewer systems are of highest priority for most local officials. Nearly all water systems are publicly owned. Telephone, electricity, and natural gas systems are generally adequate for the region, with some exceptions where local shortages may occur.

Prior to the current industrial development of both coal and trona, the region's lifestyle was primarily ranching with very little industrial development. In the last six years, rapid development of coal and trona, and expanding oil and gas exploration have brought about higher prices, more crime, housing shortages, and other boomtown characteristics which have altered and are continuing to alter this rural lifestyle.

Most of the land is Federally owned and administered by the Bureau of Land Management and the U.S. Forest Service. Within the Federal land area, some state and private lands occur. Of significant interest in the southern portion of Wyoming is the checkerboard pattern of alternating private and Federal lands interspersed with some state-owned sections.

4.7 FORT UNION COAL REGION

The Fort Union Coal Region is in the Northern Great Plains of the western United States. This region encompasses about 60,214 square miles in 12 Montana, 26 North Dakota, and seven South Dakota counties.

4.7.1 The Environment

The sedimentary rocks of the Fort Union Coal Region were deposited in the Williston basin, a sedimentary and structual depression that lies in western North Dakota and extends into Canada, Montana, and South Dakota. The combined thickness of the sedimentary rocks exceeds 15,000 feet in the deepest part of the basin southeast of the city of Williston, North Dakota. The surface formations generally dip toward the basin's center at rates of 10 to 20 feet per mile, but dips may decrease to about one degree near large structures, such as the Nesson anticline. Local departures from the regional dip, especially in the coal beds, may be the result of differential compaction of the underlying sediments rather than a deep-seated earth movement.

Most of the coal is contained in the Lebo, Tongue River, and Sentinel Butte (in North Dakota), members of the Fort Union Formation of Paleocene age. The coal beds are discontinuous and vary greatly in thickness. More than a hundred coal beds have been identified by the North Dakota State Geological Survey, but in any one section no more than three beds of commercial thickness have been found. The Fort Union Formation ranges from 425 to 775 feet thick in South Dakota to 1,500 feet thick in Montana and contains an estimated 440 billion tons of lignite. The coal throughout most of the Fort Union region is lignite in rank; however, westward from the Montana-North Dakota state line, the rank of the coal increases to subbituminous C near Miles City, Montana and subbituminous B further to the west. Estimated subbituminous reserves in the aforementioned areas total approximately 23 billion tons of surface-mineable coal.

The Fort Union Coal Region is within the glaciated and the unglaciated Missouri Plateau sections of the Great Plains Physiographic Province, except for a small area at the northeastern boundary which is part of the Central Lowland Province. The Missouri Escarpment which is the eastern boundary of the Great Plains Province is a northeastward facing escarpment, commonly 200 to 300 feet high. It extends from the northeast corner of North Dakota diagonally to near the center of the south boundary and beyond into South Dakota.

The Drift Prairie section of the Central Lowland east of the escarpment includes a large

part of eastern North Dakota. Glacial deposits, such as ground moraine and outwash plains, are characteristic of the gently undulating land surface. They may be as much as 200 feet thick, but generally, the relief is 20 feet or less. In the part of the area north and east of the Missouri River, channels cut into the glacial drift by meltwater from the ice are common. They are generally 20 to 50 feet deep, and range in width from 100 feet to as much as one-half mile. Most are partly filled by glacial outwash and alluvial material. Some coincide with deep preglacial valleys.

Southwest of the Missouri River, glacial deposits are thin or absent, natural ponds are absent, and the boundary of the Glaciated Missouri Plateau is poorly defined. The maximum extent of glaciers is marked by the locations of glacial erratics. The major streams and their tributaries are in preglacial or interglacial valleys. The general character of the terrain is similar to that of the unglaciated region to the south.

The unglaciated Missouri Plateau in southwest North Dakota, northwest South Dakota, and eastern Montana, is a gently sloping plateau. The present surface consists of rolling prairie, isolated buttes and mesas, and badlands. It has been mostly carved since the ice age by intermittent erosion of the nearly flat-lying easily-eroded rocks at the surface.

Clinker, formed when heat from the natural burning of coal baked the overlying rocks, has been a factor in the formation and development of badland topography. The level of the surface above the burned coal bed is lowered by a number of feet equal to the thickness of the burned coal bed. The clinker strongly resists weathering and erosion, and it forms a cap-rock that adds to the irregularity and roughness of the land surface.

Badlands are found along the Little Missouri River, along the lower reaches of the Powder River, and the area surrounding Fort Peck Reservoir on the Missouri River.

The Fort Union Coal Region has a semi-arid continental climate. Winters are long and cold; summers are short and warm. Considerable frontal activity passes through the area, but being distant from major sources of moisture, precipitation is not plentiful. A dozen to 15 times a year, arctic air breaks into the region, causing severe winter cold. The extreme cold is often moderated in the western and southern portions of the area by chinook winds that develop on the eastern slopes of the Rocky Mountains.

The mean annual temperature varies from 38°F in some locations in the northeast part of the region to 45°F in the southeast portion. This area is subject to the dominant path of arctic generated storms crossing the Canadian-U.S. border, as well as the chinook winds that moderate the cold temperatures in the western portion of the region.

Annual precipitation varies from slightly less than 12 inches in northeastern Montana to 16 inches in the eastern portion of the region. A few points near prominent terrain features cause slight aberrations in the otherwise smooth increase in average precipitation from west to east. Most precipitation occurs in the growing season, occurring as showers or thunderstorms. Rainfall, therefore, tends to be spotty and local flooding may occur not far from places that are enduring drought.

Floods along the main stem of the Missouri River are generally caused by spring snow-melt and are aggravated by ice jams. Major rainstorms sufficient to cause widespread flooding are rare. Drought effects usually appear in this semi-arid region soon after the precipitation drops much below the long-term mean. The windy, sunny conditions that prevail in the area cause evaporation to exceed normal precipitation by a factor of two or more.

The region is windy; average speeds for the year are 10 mph. The prevailing direction is northwest, but southerly winds are common during warm months.

Surface-based inversions occur on about 65 percent of winter mornings and 80 percent of summer mornings. Forty to 50 percent are accompanied by winds of 5 mph or more. On summer afternoons, surface-based inversions are rare; on winter afternoons, they occur 25-30 percent of the time. Morning mixing depths tend to be lowest in summer in the eastern part of the region and in the winter in the western part.

The Fort Union Coal Region's air quality is very good for both particulates and sulfur dioxide. This holds true for all portions of the region.

Surface water resources are very limited in the Fort Union Coal Region except for those areas adjacent to the Missouri and Yellowstone Rivers. The Little Missouri River, which runs north through the middle of the region to the Missouri,

and all of the tributaries to the Missouri downstream from that point have highly variable flows.

Surface water runoff is very low (less than one inch over most of the area) and quality is poor. Total dissolved solids exceed 350 million parts per liter nearly everywhere. Hardness levels are mostly within the 180-240 mg/1 range. These tributaries generally carry a sediment load in excess of 1,900 mg/1. Sediment loads have been greatly reduced in the Missouri River since it has been extensively dammed, with each reservoir acting as a sediment trap.

Groundwater is available in small to moderate quantities almost everywhere, but only in large amounts locally, particularly in the alluvial valley fills along the perennial streams. The greatest potential for groundwater development in the region is from glacial outwash sands and gravels and valley alluvium, particularly along the Missouri River and, in lesser amounts, along the Yellowstone River. Groundwater may also be developed in dependable supplies from the Fort Union Formation and the deeper Fox Hills and Hills Creek Formations. Most of these deeper groundwaters are moderately mineralized at depths of less than 500 feet.

Soils in the northeastern half of the region have been derived from glaciated materials. These soils are generally loamy soils with good productivity and stability. The area northeast of the Missouri escarpment is rolling mid-tall grass prairie characterized by wheat grass, big and little bluestem grasses, and needle grass. The remainder of the region is dominated by the mid grass and mid-short grass prairie type, except for the floodplains along the major streams and the badlands on the Little Missouri, Lower Powder, and around Fort Peck Reservoir.

The mid-grass prairie which covers the mid-section of the region is characterized by loamy to clayey loamy soils from east to west. Dominant plants are needle grass, wheat grass, and blue stem grasses. No short grasses are dominant. The mid-short grass type is found in the extreme western portion of the region north of the Yellowstone River. These rolling prairies have loam to clay loam soils and are dominated by western wheat grass, needle-and-thread grass, and blue grama grass.

Badlands are characterized by breaks along rivers and streams with steep south-facing slopes of exposed shales, sandstones, scoria, and clays. Soils are dry much of the year. Dominant plant species are arid-land shrubs and grasses associated locally with scrubby ponderosa pine forests.

The floodplains have alluvial soils with high water tables. Vegetation is predominantly hardwood trees and shrub species.

With proper soil and vegetative management, most lands can be reclaimed to a near-original state following surface mining. It should be noted, however, that much of the prime farmlands, alluvial valley floors, and natural areas would require a high degree of attention during reclamation.

Wildlife occurring in the Fort Union Coal Region is similar in composition to that of the Powder River Region. The various habitats support 87 species of birds, approximately 70 species of mammals, 200 species of fish, and 20 species of amphibian and reptiles, as well as numerous insects and other invertebrates.

Principal big game animals include mule deer, whitetail deer, and pronghorn antelope. While ranges may occasionally overlap, each is associated with a preferred habitat. Primary mule deer habitat is provided by the rough breaks and badlands where browse species, such as buckbrush, skunkbrush, yucca, chokecherry, and mixed grasses occur. Whitetail deer, while widespread throughout the region, prefer river bottoms and other areas where dense vegetation provides adequate cover. Preferred food items include buckbrush, chokecherry, rose, cottonwood, willow, aspen, and green ash. Prime pronghorn antelope range occurs on the rolling or broken grasslands interspersed with large sagebrush flats. Where available, big sagebrush and silver sagebrush provide critical winter browse.

Principal small game animals within the region include eastern cottontail, desert cottontail, snowshoe hare, gray squirrel, and fox squirrel.

The eastern cottontail is widely dispersed through the area, while the desert cottontail prefers shrubland habitat. Snowshoe hare, fox and gray squirrels are typically associated with woodlands.

Furbearers and other small mammals associated with this region include typical grassland species such as Richardson ground squirrel, thirteen-lined ground squirrel, blacktailed prairie dog, western harvest mouse, deer mouse, meadow vole, prairie vole, and blackfooted ferret; woodlands

and shrubland species, such as gray fox, raccoon, badger, skunk, bobcat, opossum, least chipmunk, wood rat, and southern red backed vole; and wetland and semi-aquatic species, such as beaver, mink, and muskrat.

Gamebirds of the region include sharp-tailed grouse, ring-necked pheasant, Hungarian partridge, and wild turkey. Both sharp-tailed grouse and the introduced pheasant prefer large expanses of undisturbed native grasslands interspersed with brush for food, cover, and nesting. The Hungarian partridge is widely dispersed but prefers areas of limited agriculture where shelterbelts are available for cover. Wild turkey are more limited in distribution and tend to be associated with river botton woodlands, or around ranches and farms where they have become accustomed to human activity.

Wetlands, occurring primarily as scattered potholes along the Missouri River and other drainages within the region, are of primary value as nesting and feeding habitat for waterfowl of the Central Flyway. Breeding species include mallards, green-winged and blue-winged teal, pintail, redhead, canvasback, gadwall, American widgeon, shoveler, and wood duck. Shorebirds and other non-game birds associated with these wet areas include cranes, grebes, sandpipers, terns, and gulls.

The large areas of open terrain found throughout much of this region provide both seasonal and year round habitat for a variety of predator birds. These include golden and bald eagles, osprey, marsh hawk, sharp-shinned hawk, rough-legged hawk, Swainson's hawk, Cooper's hawk, red-tailed hawk, prairie and peregrine falcon, barn owl, long-eared and short-eared owl, burrowing owl, and great horned owl.

Open areas, woodlands, and edges are utilized by a wide variety of song birds, warblers, and woodpeckers. At least 145 species of non-game birds occur within the region, including black-billed cuckoo, belted kingfisher, red-headed and red-bellied woodpeckers, catbird, robin, eastern and mountain bluebirds, yellow warbler, tree and chipping sparrows, cowbird, and cardinal. Principal species of game fish stocked in reservoirs and lakes include walleye, sanger, northern pike, white bass, yellow perch, largemouth bass, channel catfish, and black bullheads. Non-game species common to most streams and rivers include a variety of minnows, shiners, and suckers.

There are at least seven species of endangered animals that occur or have been reported in the region. These include the northern kit fox, peregrine falcon, black-footed ferret, whooping crane, bald eagle, and Tule white-fronted goose. Presently there are no endangered or threatened plants in the region, although a number are proposed for inclusion in the Federal list. They may eventually be given protection under the Endangered Species Act of 1973.

4.7.2 The Environment and Man

The Fort Union Coal Region has experienced many changes in climate since the Paleo-Indian crossed a land or ice bridge from Asia to the Western Hemisphere. There is evidence that the region has a prehistory much like the Powder River Coal Region. The distinctive culture of the Fort Union Coal Region was agriculturally oriented along both sides of the Missouri River in North Dakota. The region's history is marked with Indian-settler interactions both peaceful and non-peaceful. Evidence of these events still remain such as Fort Union Trading Post and Fort Dilts.

The historical development of the region left most of the land in Federal ownership, with the Bureau of Land Management and the U.S. Forest Service being the primary administering agencies. Within Federal land areas, some state and private lands occur. Of particular interest are the scattered tracts of alternating private and Federal lands (interspered with some state-owned sections), which create a checkerboard pattern of land ownership.

Agriculture in this region consists primarily of spring wheat farming in the northern and eastern portions, and cattle ranching with some irrigated crop production in the southern and western portions. Farms tend to be large, averaging over 1,000 acres in commercial wheat growing areas in the region.

Cropland constitutes over 75 percent of the total land area along the northeastern border of the region decreasing to under 5 percent in the southern portion (Montana and South Dakota). Irrigated cropland represents less than 1 percent of the farmland over most of the region, with some counties in Montana and North Dakota having from 1 to 4 percent of cropland irrigated.

Principal agricultural crops grown within the region include soybean, hay, wheat, oats, barley,

flaxseed, and sugarbeets. Yields per acre for these crops are 17.3 bushels for soybeans, 1.4 tons for hay, 24.6 bushels for wheat, 42.1 bushels for oats, and 19.3 tons for sugarbeets. Cash-grain farms, along with livestock farms and general farms, are found in the northern and eastern portions of the region, while livestock operations predominate in the other areas of the region.

Table 4-9 shows the employment and earnings for the Fort Union Coal Region. Federal, state, and local governments employ 28 percent of the population. This is significantly higher than the national average which is 17 percent. Federal employment is 3 times greater than the national average. Agricultural employment is the second strongest sector, employing 25 percent of the population. This is five times the national average. This statistic emphasizes the dependence of the region's people on the biological productivity of the region.

The region's transportation network is composed primarily of railroads and highways. The Burlington Northern is the primary rail carrier of the region, although the Soo Line and Chicago, Milwaukee, St. Paul, and Pacific also provide a degree of service. The area's access to the interstate highway network is provided by I-94. A variety of U.S., state, and county roads connect with I-94. There are no coal slurry pipelines in this region.

The infrastructure of the region is similar to most of the rural West. Businesses that supply the needs of farmers and ranchers are located in trade centers across the region. These trade centers are small and, along with the rural population, are relatively stable. Public services in these towns are limited and not usually amenable to significant expansion. Medical facilities are limited and those in need of special care usually travel to Denver, Colorado, or Rochester, Minnesota. Bismarck, North Dakota is the exception to the rule. It is a growing urban center that is developing many of the social and cultural services not found in the smaller towns of the region.

Due to the rural nature of the region most of the recreation is outdoor oriented. Fishing, hunting, and site-seeing are common activities. Hunting also draws people from outside the region.

4.8 SAN JUAN RIVER COAL REGION

The San Juan River Coal Region is in the Colorado Plateau of the southwestern United States. The region encompasses approximately 57,000 square miles in one Utah, seven Colorado, and 11 New Mexico counties.

4.8.1 The Environment

This region is part of the Colorado Plateau physiographic province with high plateaus of stratified rock cut by deep canyons. Elevations generally range between 5,000 and 7,500 feet. Topographically, it is a basin with mesas, rolling plains, badlands, and canyons that are lower than the surrounding mountain ranges: the San Juan Mountains to the north, the San Pedros to the east, the Zunis to the south, and the San Francisco Peaks to the west.

The region's variety of landforms has resulted from its geology and the forces of erosion. Mesas and ridges are held up by caps of sandstone, whereas the adjacent lowlands have formed by erosion of the softer shales. The Menefee Formation, which is mostly shale, lies beneath relatively thick sandstone and forms the lowlands and valleys. Steep-walled canyons form where the resistant sandstone is thick. Badlands form in thick shale sequences imbedded with thin lenses of sandstone. The Fruitland Formation, which is composed of shale, minor amounts of sandstone, and some coal, has been carved by water and wind into distinctive badland shapes.

The San Juan River Coal Region contains sedimentary rocks ranging in age to 500 million years. The Paleozoic formations, chiefly marine limestones, sandstones, and shales, do not crop out in the region, although they underlie it. In places along the southern part of the region, this formation forms an aquifer capable of yielding water for irrigation, industrial, and municipal use. The Triassic and Jurassic formations are chiefly nonmarine sandstones, and claystones. The Entrada Sandstone and the Westwater Canyon Member of the Morrison Formation form important aquifers that may be utilized for coal development.

The formations of greatest interest are those of Upper Cretaceous age. In addition to containing coal, some form important aquifers, and many contain important fossil assemblages. When these formations were deposited, the shoreline of a large interior sea was moving back and forth in a general northeast to southwest direction through the region, so the deposits vary considerably in thickness and lithology. Most of the coal formed in

TABLE 4-9

POPULATION AND ECONOMIC CHARACTERISTICS IN THE FORT UNION REGION (a)

1975 Total Population[a]	324,399
Total Area (square miles)[a]	60,214
Population per square mile (1975)	5.4
Per Capita Personal Income (1975)	$5,083
Per Capita Personal Income as a Percent of National Average (1975)	100

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	8,753	7	78,798	6
Other Agriculture	21,833	18	318,424	25
Metal Mining	-	-	-	-
Coal Mining	256	0-1	7,019	1
Oil and Gas	1,678	1	22,051	2
Other Mining	437	0-1	1,763	0-1
Construction	3,798	3	85,081	7
All Manufacturing	4,759	4	49,210	4
Transportation, Communication, and Public Utilities	4,098	3	94,538	7
Wholesale and Retail Trade	23,754	19	212,002	16
Finance, Insurance, and Real Estate	3,651	3	34,074	3
Other Services	15,964	13	147,154	11
Federal Govt.	11,741	9	129,261	10
State and Local Govt.	22,912	19	120,228	9
TOTAL	123,634		1,299,603	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

backshore swamps along the seacoast. The Crevasse Canyon, Menefee, and Fruitland Formations are the principal coal-bearing units.

Coals within the region rank from high-volatile A to B bituminous, to discontinuous and dirty coals that are high-volatile C to B bituminous with high ash content. Most coals are sub-bituminous. The region's estimated reserve base is 4.2 billion tons.

The region lies south of the major storm belt from the Pacific across the Rockies. The general climate is semi-arid, with variations resulting from elevation and topography. The Pacific fronts that trail across the region deposit most of their moisture on the mountains to the west. In the colder season, storms that develop off southern California move through the region once or twice a year and produce some precipitation, mostly on higher terrain as snow. During the summer, widely scattered showers and thunderstorms occur but coverage is spotty and erratic, often leading to drought in many areas of the region.

Annual mean temperatures vary from 48°F to 52°F. Temperatures exceeding 100°F occur throughout the region, while subzero temperatures are uncommon except in the mountains. A distinctive feature of the climate is the large variation in the daily high-low temperatures.

Annual precipitation averages less than 10 inches for most of the region, though points in northern New Mexico and southwestern Colorado receive 20 inches or more. At lower elevations, about half the precipitation falls between May and August. At higher elevations, a greater proportion is received from winter storms. Summer rainfall is mostly from intense local thunderstorms that frequently cause flash floods. Potential evaporation exceeds normal precipitation by a factor of 6 or more.

Wind direction tends to show the effect of local topography. Generally, winds are westerly during the day and easterly during the night, but terrain features complicate the wind field and cause significant deviations. For example, uneven cooling of the air results in downslope drainage of cold dense air during calm, clear nights; and the heating of valley walls and hills causes air to flow upslope and out of the valleys on calm,fair days. These terrain-induced circulations are common with the complex topography in all sections of the region.

Mixing heights and transport winds in the region have seasonal and diurnal variation. Generally, mixing heights are higher in the afternoon than in the morning. Seasonally, morning mixing heights are lowest during winter months, due to radiation inversions and afternoon mixing. Surface-based inversions occur 80-90 percent of the mornings throughout the year but are uncommon during afternoons. Stagnations are very prevalent. Ventilation values are highest in the spring because of the strong transport winds and lowest during the winter because of long nights, short days, snow cover, and persistent high-pressure systems. These various conditions result in a rather poor potential for pollution dispersion during certain periods of the year.

Nevertheless, for the most part, the region's air quality is considered good and better than the national standards. High winds can pick up dust which can cause or result in high particulate content in local areas for several days at a time. Areas generally not meeting the standards for particulate content include the industrial areas around the Four Corners and San Juan generating stations in San Juan County, New Mexico. Sulfur dioxide air quality is generally better than the national standards except near the generating stations about 15 miles west of Farmington, New Mexico. The region is now primarily rural except for the towns of Gallup and Farmington, New Mexico and Durango, Colorado. Most industrial, commercial, and population growth is expected to be in these urban areas. As this occurs, the air quality will probably deteriorate.

Major rivers draining the region are the San Juan, the Colorado, and the Little Colorado. The region encompasses headwaters of the San Juan, the only stream that receives flow from outside the area. Potential evapotranspiration ranges from less than 24 to about 35 inches per year. Runoff in the Little Colorado and its numerous dry washes is almost nil. Average annual stream flow for the region measured at the confluence of the San Juan and Colorado Rivers is approximately 2.6 million acre-feet. Surface reservoirs of the region store 27.1 million acre-feet.

Only in the upper reaches of the higher tributaries of the San Juan, in Colorado, is the sediment concentration low or medium. Over most of the San Juan River Coal Region the sediment concentration exceeds 1,000 milligrams per liter.

Summer thunderstorms and spring snowmelt often create floods of damaging proportions that carry tremendous loads of sediment. During such high-flow periods, the suspended-sediment content of the San Juan River and many of its tributaries may exceed 50,000 parts per million. Hardness of the surface water throughout most of the region exceeds 240 mg/liter, and all three major streams average at least 1,000 mg/liter of total dissolved solids. Approximately 1 million acre-feet of surface water is withdrawn each year for consumptive use, mainly irrigation.

Groundwater in the region is generally good where it is available. Nearly all sandstone formations in the region yield water, which is generally sufficient for livestock and domestic purposes. Wells developed in riparian deposits or in sandstone aquifers deliver 50 to 500 gallons per minute. Groundwater withdrawals for consumptive use in the region are approximately 50,000 acre-feet per year. The heaviest groundwater pumping is in the Gallup, New Mexico, area, which is part of the Little Colorado drainage. There pumpage to meet the demands of industry associated with coal and uranium is removing more water from the aquifers than can naturally be replaced.

In general, the San Juan River Coal Region is characterized by steep slopes covered with only sparse vegetation and a semi-arid climate with an extremely variable precipitation. Formation of top soil is slow because parent materials are predominately sandstone and shale for all soils in the region. Permeability is slow to moderate, and the soils are used primarily for grazing. Rich alluvial soils occur along the floodplains and alluvial fans, but these make up only a small percentage of the region. The major limitations of the region's soils are shallowness, salinity, and erodability.

The region contains three major vegetative communities: grassland and grassland-shrub (lower altitudes), pinyon-juniper (5,000-7,000 feet), and montane coniferous forest (above 7,000 feet). Wildlife within the region includes at least 100 species of mammals, 116 species of birds, and 28 species of amphibians. Several species are unique to this region.

Many of the grassland-shrub areas in the region have been severely overgrazed by livestock. Dominant plant species within this habitat type include green joint fir at higher elevations and rubber rabbitbrush, greasewood, and pale wolfberry along the dry washes and arroyos. Fourwing saltbush and snakeweed may be locally abundant. Typical grasses include galleta, blue grama, sand dropseed, and Indian ricegrass. Russian thistle and cheat grass are common on overgrazed areas. Much of the region is dominated by big sagebrush. Common mammals in these areas include pronghorn antelope, black-tailed jackrabbit, desert cottontail, sagebrush vole, northern grasshopper mouse, Ord's and Great Basin kangaroo rats, prairie dog, badger, coyote, and western spotted skunk. Common birds include Gambel's quail, sage grouse, mourning dove, loggerhead shrike, sage thrasher, sage sparrow, Brewer's sparrow, red-tailed hawk, ferruginous hawk, and great horned owl. Reptiles, particularly lizards and snakes, are well represented. Common species include sagebrush lizard, leopard lizard, side-blotched lizard, bullsnake, plateau whiptail, racer, and western rattlesnake. This habitat is heavily populated by rodents adapted to dry conditions.

The woodland-bushland community supports wildlife from grassland and grassland-shrub associations plus some additional species. Typical trees and shrubs include pinyon pine, juniper, big sagebrush, Utah serviceberry, oak, fourwing saltbush, antelope bitterbrush, mountain mahogany, and cliffrose. Characteristic mammals include mule deer, rock squirrel, cliff chipmunk, desert woodrat, pinyon mouse, bushytailed woodrat, coyote, and bobcat. Birds include the ash-throated flycatcher, scrub jay, pinyon jay, blue-gray gnatcatcher, western bluebird, and acorn woodpecker.

Typical species of coniferous forest and forest edge communities include Douglas-fir, blue spruce, Englemann spruce, aspen, and oak. Typical mammals include mule deer, elk, snowshoe rabbit, red squirrel, golden-mantled ground squirrel, deer mouse, porcupine, black bear, marten, and cougar. Birds include the mountain bluebird, varied thrush, western tanager, common raven, gray jay, blue grouse, pygmy owl, flammulated owl, saw-whet owl, great horned owl, and golden eagle.

Numerous plant species proposed for endangered or threatened status exist in the San Juan River Coal Region. Presently, however, no plant species in the region are classified as endangered. Endangered fauna includes the whooping crane, Mexican duck, bald eagle, peregrine falcon, thick-billed parrot, and gray wolf.

All areas within the region can probably be reclaimed after disturbance, provided that topsoil is replaced as a plant medium and adequate moisture is available for plant germination and emergence. The fragile nature of the area's soil and the relatively low precipitation, however, would require a high degree of attention during reclamation.

4.8.2 The Environment and Man

The San Juan River Coal Region is one of the most interesting historical and archaeological regions in North America. The earliest known use of the region, dating back as far as 10,000 B.C., was by mobile hunter-gatherers. This subsistence pattern continued until about two and three thousand years ago, when the Anasazi people began a more settled existence and started raising domestic plants, such as squash, corn, beans, amaranth, and chili. Large multi-storied pueblos developed, reaching a peak of elaboration at about 1,000 to 1,100 A.D. Their locations appear to have been determined primarily by the availability of water for floodwater farming and controlled irrigation. Recent evidence indicates that major pueblos were linked by a complex road network; and it is possible that the entire San Juan River Coal Region was organized into a regionwide economic and political system. During the 1300's the area along the San Juan River was abandoned for unknown reasons.

The earliest Navajo materials are found in the north-central part of the region, along the Colorado-New Mexico border. After acquiring sheep from the Spanish, the Navajos spread quickly, and by about 1800, herding and limited agriculture were dominant economic patterns throughout the region.

Spanish explorers and missionaries ventured into the northern Southwest in the 16th, 17th, and 18th Centuries, but it was not until the early 1800's that non-Indians arrived with any frequency. Trappers, miners, and traveling merchants began arriving regularly during the early to mid-1800's. During the period between 1850 and 1890, Army expeditions extensively mapped the region, restricted Indian activities, and established forts; and traders greatly increased the level of Indian contact when the Atlantic and Pacific Railroad crossed the southern portion of the region. By 1890, about one-fourth of the area was settled. At present, there are approximately 30 listings in the National Register of Historic Places for this region, many associated with Indian tribes.

The economic patterns of the region are closely related to energy development. The three economic sectors that supply the majority of jobs are commercial and professional services, wholesale and retail trade, and mining. These three sectors accounted for 75 percent of all employed workers as of 1974. Table 4-10 provides an overview of pertinent economic and demographic data for the San Juan River Coal Region. Economic development has been relatively orderly, although some localized problems have resulted.

Commercial and professional services are largely limited to the population centers. Most services are related to the oil, gas, and mining industries. The expansion of urban areas, as distribution, transportation, and communication service centers, has been simultaneous with the growth of light industry. The expansion of government services is related to the vast holdings of Federally controlled lands within the region. Approximately 42,803 workers, or about 43 percent of the total work force is involved in services.

Mining has been important to all the states in the region. Much of the growth of the transportation, communication, and utilities sectors of the economy has stemmed from mining activity. Coal has been mined historically in all states of the region, but only recently have these reserves received national interest. Oil and gas are produced in half of the counties and are the leading commodities in one-quarter of the counties. The most common mineral produced in the region is sand and gravel, but a wide variety of metals (uranium, copper, zinc, lead, vanadium, gold, silver, and iron) and nonmetallic (crushed stone, clay, gypsum, lime, potassium salts, and salt) are also mined.

Historically, agriculture was the principal employment sector until the early 1950's, when energy-related development started to increase. With population increases, urban expansion moved to the prime agricultural valleys.

Agriculture in this area consists of irrigated farming along water courses and the grazing of cattle and sheep. Dryland farming is important locally, especially in the Colorado portion of the basin. The value of farm products sold is less than $1 per acre of land throughout the region; most

TABLE 4-10

POPULATION AND ECONOMIC CHARACTERISTICS IN THE SAN JUAN RIVER REGION (a)

1975 Total Population[a]	351,143
Total Area (square miles)[a]	57,047
Population per square mile (1975)	6.2
Per Capita Personal Income (1975)	3,753
Per Capita Personal Income as a Percent of National Average (1975)	74

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	3,957	4	23,374	3
Other Agriculture	3,805	4	17,707	2
Metal Mining	3,495	4	37,169	5
Coal Mining	283	0-1	7,478	1
Oil and Gas	3,887	4	29,205	4
Other Mining	445	0-1	2,585	0-1
Construction	4,649	5	65,362	8
All Manufacturing	6,331	6	46,679	6
Transportation, Communication, and Public Utilities	3,567	4	59,822	7
Wholesale and Retail Trade	21,551	22	136,141	17
Finance, Insurance, and Real Estate	3,344	3	28,623	4
Other Services	14,082	14	121,665	15
Federal Govt.	6,991	7	78,495	10
State and Local Govt.	21,730	22	147,222	18
TOTAL	98,117		801,527	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

income is derived from sales of cattle and sheep. Principal agricultural crops grown within the region include corn, hay, wheat, cotton, and sugarbeets.

Relatively low population, remoteness, and breathtaking scenery combine to make recreational opportunities almost unlimited. Two rivers in Colorado, the Dolores and Los Pinos, are under consideration for inclusion in the Wild and Scenic Rivers System. There are six National Monuments in the region and twelve state recreational facilities. The most popular recreational activity in this region is camping, followed by fishing, picnicking, and hunting. Recreation is showing significant economic growth in all areas.

Land ownership throughout the region is primarily Federal. Federal lands are National Forest and public lands (administered by BLM). Indian land also is prevalent. Only a small percentage of the land is private. This has made urban expansion expensive and difficult.

The region is well supplied with energy by the Colorado River Storage Project of the Bureau of Reclamation, by municipal, private, and cooperative power companies, and by natural gas distributors. Recent growth in demand for electricity has been rapid. Demand for natural gas has been increasing at a lesser rate, due to rising prices. Transportation facilities are best developed in urban areas. The major transportation network within the region are highways, but neither construction nor maintenance has kept up with the expanded use. Railways are almost non-existent, although an east-west main-line of the Santa Fe Railway traverses the region.

Water may be one of the most stringent limits on future growth. Water supply and wastewater treatment require advanced technologies in what is essentially a desert environment. Few rural communities in the region possess the water supply systems and wastewater treatment facilities that are features of urban areas. Surface water is scarce; groundwater often has a large quantity of minerals and salts and must be processed.

4.9 UINTA-SOUTHWESTERN UTAH COAL REGION

The Uinta-Southwestern Utah Coal Region, is in the Colorado Plateau and Uinta Basin of the southwestern United States. This region encompasses about 57,000 square miles in six Colorado and 14 Utah counties.

4.9.1 The Environment

The general area is characterized by extremes in both topography and climate. The higher peaks and plateaus rise above the adjacent lowlands which, in turn, are from about 3,000 to over 5,000 feet above sea level. Extremely steep slopes and narrow, vertically walled canyons prevail throughout much of the region. Many of the coal deposits are in the flanks of the major peaks and plateaus at intermediate elevations.

The Uinta portion of this region, the northern majority of the region in Utah and Colorado which contains the south slope of the Uinta mountains, is a structural basin with rocks on the southern flanks of the basin dipping gently toward the center. Rocks on the northern and northeastern flanks are steeply dipping with overturned beds and major faults. The remaining Southwestern Utah portion of the region includes a series of plateaus in a shallow structural basin. Many of those areas are separated by a series of major faults, including the Hurricane, Sevier, and Paunsaugunt Faults. A number of geologically significant areas within this region have been included in the National Park System as parts of Zion, Bryce Canyon, and Capitol Reef National Parks, and Cedar Breaks National Monument. A number of areas, less known to the general public but almost equally spectacular and geologically unique, have been designated by the Bureau of Land Management as outstanding natural areas. For examples, the canyons of the Escalante River and its tributaries contain numerous natural bridges and arches, towering rock monoliths, and sheer sandstone cliffs.

Principal minerals are coal, petroleum, natural gas, copper, zinc, lead, vanadium, gold, silver, and iron. Oil shale and tar sands, as well as conventional petroleum sources, are extensive.

The geological age of the coal deposits date back to the Cretaceous and Paleocene ages. Coal seams are primarily deep deposits of medium to high volatile A and B bituminous. The region's coal reserve base is estimated to be approximately 6 billion tons.

Fossils of prehistoric plants and animals are widespread. One of the nation's major concentrations of dinosaur remains is in the Utah portion of

Dinosaur National Monument. Other deposits occur throughout the region.

Prevailing southwest winds, that move across the Colorado and Mohave Deserts, give most of the region an arid climate with a very high evapotranspiration rate. However, rugged topography and great differences in elevation and orientation cause great variations in temperature and moisture within short distances. The result is a mosaic of microclimates with significant differences between north and south facing slopes, and between sheltered canyon bottoms and exposed ridges. At higher elevations subzero winter temperatures are common. Summers are cold and growing seasons are short. The higher peaks and mountain ranges are covered with snow, often several feet deep, several months of the year.

The lower elevations are characterized by hot summers, with temperatures frequently exceeding 100°F, especially in southern portions of the region. Even at lower elevations subfreezing temperatures occur frequently in the winter.

The clear, dry air typical of much of the area is conducive to rapid temperature changes. It is not unusual to have temperatures in the eighties at midday and frost at night within the same 24-hour period.

In spite of the prevailing general movement of air from west to east many local wind variations result from the rugged topography. Warm air rises from the valley floors and plains during the day and cold air drains down from the higher elevations at night. Local wind flows created by these factors can be quite strong. As a rule, however, their persistence is not great.

Throughout rural portions of this region, air quality is generally very good. There are no major concentrations of particulates, sulfur dioxide, or nitrogen dioxide. Occasionally, however, air quality problems occur in the closed valleys where temperature inversions trap and hold urban and industrial emissions.

Because of the high evapotranspiration rate during summer months, winter precipitation is usually more effective in providing soil moisture and groundwater recharge.

Water from much of the region drains east and south into tributaries of the Colorado River. Principal Colorado tributaries include the Green, White, Duchesne, Price, Dirty Devil, Escalante, Paria, and Virgin Rivers. The Yampa River, though just outside the region, contributes significantly to flows of the Green. The remainder of the region, including the Provo and Sevier Rivers, is in the Great Basin hydrologic region.

Most precipitation occurs on the high mountains and plateaus. Watersheds at lower elevations contribute little to base stream flows because of low precipitation and high evapotranspiration rates. Therefore, most streams diminish rather than grow in size after leaving the mountains. This natural tendency is intensified by extensive diversions and consumptive use of water by man. The Sevier River is subjected to extremely heavy use with much of the water rediverted and reused several times along its course, and is largely depleted by the time the river reaches Sevier Dry Lake.

Most streams originate in the high timbered country of the headwaters. As they descend, they accumulate sediments and salts from the highly erosive watersheds at lower elevations. This natural trend is intensified by diversion of water, primarily for irrigation. Water returning to the stream as drainage from irrigated agriculture carries an increased loading of salts and sediments. Tributaries originating at lower elevations are usually intermittent. Stream flows and surface water use have not been quantified for this region specifically, and flows are probably less than 6 million acre-feet per year.

Dissolved solids in streams of the region range from 120 to 350 milligrams per liter in the western base of the Wasatch Mountains, and tributaries to the Upper Strawberry, which drain the south face of the Uinta Mountains. Over the remainder of the region, total dissolved solids values are greater than 350 mg/1. In some basins total dissolved solids exceed 1800 mg/1. Sediment concentrations are variable, but are greater than 1900 mg/1 in the larger perennial rivers. Suspended sediment concentrations vary extensively throughout the region.

The region is underlain by low permeability rocks that generally yield less than 50 gallons per minute to wells. However, in some of the alluvial valley fills, particularly those containing gravels and sands, yields of several hundred gallons a minute can be obtained. The quality of bedrock water supplies is generally poor.

Over much of the region soils are poorly developed. The combination of steep slopes and semi-arid to arid climate, with highly variable

precipation, results in a naturally high rate of erosion. Wind erosion is significant in southern portions of the region. Formation of top soil is quite slow. In the geologic past, much of the region was covered by a shallow sea which contributed salts to the land. In much of the region the high evapotranspiration rate has caused further concentration of salts in many areas. Salts are generally more concentrated in soils of flat valley floors and closed basins. The more productive soils frequently occur on benches, alluvial fans and gentle slopes, where there is sufficient drainage to minimize the accumulation of salts.

In addition to soil problems inherent to the topography, climate, and geological history of the region, severe range and watershed abuse by the early settlers caused loss or degradation of much of the limited and fragile original top soil. Continued heavy grazing has limited recovery of damaged areas in many cases.

Soils of the eastern part of the region generally are sandy loam, loam, or silty loam with a calcium carbonate accumulation usually occurring at depths greater than four feet. The soils of the central portion of the region are generally steep, shallow, and poorly developed, often with many rock fragments. In the southern portion of the region, the soils are a mix of the rocky soils found in the central part of the region and soils with sandy loam to silty clay loam texture with a calcium carbonate zone at one to three feet.

Vegetation is largely a manifestation of climate and soils. Plantlife within the region forms a mosaic closely conforming to the pattern of climates caused by the rugged topography. In this arid environment, moisture is by far the most vital factor in determining what vegetation will grow in a given site. Native flora ranges from cold desert through pinyon-juniper woodland to montane coniferous forest often within a few miles. Narrow belts of streamside vegetation transect all the major vegetal communities.

Numbers and kinds of wildlife present are, in turn, determined primarily by the habitat created by existing vegetation. The great diversity of vegetation supports a corresponding diversity of wildlife including approximately 90 different mammals, 270 birds, 26 reptiles, 9 amphibians, and a great many insects and other invertebrates.

The montane forests of the higher elevations contain ponderosa and lodgepole pine, Douglas-fir, and spruce. Aspen is interspersed throughout much of the conifer forests.

Wildlife representative of the montane coniferous forests include small mammals such as snowshoe rabbit, red squirrel, flying squirrel, and porcupine; game species such as elk, black bear, mule deer; and predators such as bobcat, cougar, and marten. Moose have recently been transplanted into the region. Characteristic birds include Clark's nutcracker, grayheaded junco, mountain bluebird, mountain chickadee, hairy woodpecker, ruffed grouse, blue grouse, goshawk, great horned owl, pygmy owl, and flamulated owl. Wild turkey occur in limited areas.

The woodland-brushland, at intermediate elevations consists of juniper, pinyon pine, mountain mahogany, and oakbrush with interspersions of sagebrush and grasses.

Representative mammals of the pinyon-juniper woodland-bushland communities include rock squirrel, cliff chipmunk, desert woodrat, pinyon mouse, bobcat, bushy-tailed woodrat, mule deer, and elk. A free-roaming bison herd occurs in this vegetal type on the Henry Mountains of Utah. Birds include the ash-throated flycatcher, gray flycatcher, pinyon jay, plains titmouse, western bluebird, and the black-throated gray warbler.

Vegetation of the cold desert is dominated by salt-bush and greasewood, indicating saline soil, in lower, poorly drained areas. Sagebrush with associated grasses and forbs predominate on slopes and benches that are better drained and less saline.

In cold desert communities, typical mammals are the black-tailed jack rabbit, desert cottontail, Nuttall's cottontail, desert woodrat, least chipmunk, Great Basin pocket mouse, Ord's kangaroo rat, northern grasshopper mouse, pronghorn antelope, coyote, kit fox, skunk, and desert bighorn sheep. Characteristic reptiles are the leopard lizard, sagebrush lizard, side-blotched lizard, short-horned lizard, bullsnake, plateau whiptail racer, and western rattlesnake. Birds include red-tailed hawk, Gambel's quail, sage grouse, mourning dove, great-horned owl, loggerhead shrike, sage thrasher, sage sparrow, and Brewer's sparrow.

Streamside vegetation consists mainly of cottonwood, willow, and herbaceous wetland plants. The narrow belts of riparian woodlands are vital to many wildlife species and support a greater diversity of wildlife than any other single habitat type. This is especially true in lower and more arid

areas where the riparian vegetation is literally an oasis in the desert. The cottonwoods and other trees often provide the only nesting and perching sites in many miles for raptors and other birds.

Throughout the region, much of the vegetal cover has changed considerably since the coming of settlers and the grazing of domestic livestock. Prior to this time, grasslands were more extensive and sagebrush and pinyon-juniper more limited in area. Heavy grazing of grasses favored an increase in shrubs and woodland. This caused an increase in numbers of deer and a decrease in numbers of elk, antelope, and desert bighorn.

Reclamation of land, to the point where it supports the same vegetation and fauna that was there before disturbance, is a slow process in much of the region. In the more arid areas, the probability of seeding success without irrigation is approximately one year out of three. In a drought cycle several years may pass before suitable moisture conditions occur for reseeding success. Proper soil management and irrigation practices may, however, mitigate the adverse reclamation effects of droughts. Transplanting of seedlings is sometimes required for some desirable shrub species. Trees grow slowly, and 100 years or more may be required to replace a mature stand of timber.

In some cases, predominant existing vegetation represents a deteriorated watershed condition resulting from longterm overuse by livestock and big game animals. Therefore, restoration of the exact existing vegetation might not always be desirable.

The numerous habitat areas isolated from one another by barriers of terrain and climate have encouraged the evolution of a number of unique plant species. Eighty-four plants in the region have been proposed for Federal endangered or threatened status; however, only the Rydberg milk-vetch has been designated as threatened. None are Federally considered to be endangered. The remaining 83 may not eventually receive this status.

A number of Federally-listed endangered or threatened animals inhabit the region either year-round or seasonally. These include the bald eagle, peregrine falcon, Utah prairie dog, black-footed ferret, and whooping crane. Endangered and threatened fish include the endangered Colorado squawfish, humpback chub, and woundfin. The Virgin River spinedace and Virgin River roundtail chub have been recommended for endangered classification. The razorback sucker is on the Colorado endangered list. Additionally, Colorado cites the river otter as endangered and Utah cites the spotted bat as unique.

4.9.2 The Environment and Man

The prehistory of the region includes several distinct archeologically defined cultural periods: the Paleo Indians (big game hunters-12,000 B.C. to 500 B.C.), Archaic (hunter/gatherers-12,000 B.C. to 500 B.C.), Desert Anasazi (sedentary agriculturistic-A.D. 700 to A.D. 1250), and Paiute (hunter/gatherers-A.D. 1250 to the historic period). Numerous small groups of cliff dwellings and other archeological sites are scattered throughout canyons, mainly in southern portions of the region. Indian artifacts are scattered throughout the region. Modern Indians still occupy considerable areas.

The first documented non-Indian passage through southern Utah and western Colorado was by the Dominguez-Escalante expedition of 1776-77. The somewhat later, trade-oriented Spanish Trail also passes through the region. The region was visited in the earlier 1800's by the government explorer John C. Fremont, the famed trapper Jedediah Smith, and other trappers, fur traders, and mountain men.

Very soon after their arrival in the Salt Lake Valley in 1847, the Mormons initiated exploration and colonization missions on a substantial scale. Initial thrusts were along the western base of the Wasatch Plateau and in the Sevier River Valley where snow-fed streams from the mountains provided water for irrigation. The region was originally settled primarily for agriculture and stock raising. However, discovery of minerals soon brought about considerable mining activity in some areas. The Mormons established settlements as rapidly as possible in almost every location which the resources could conceivably support. The Colorado portion was settled in a more typical fashion. The White River Basin, somewhat isolated from the main travel routes through the mountains, was occupied by white settlers later than much of the region.

Mining of coal began in numerous locations at an early date. The coal enterprise prospered for many years supplying primarily the railroads and local domestic and industrial needs. Replacement

of coal-burning railroad locomotives with diesel-electric engines and conversion from coal to natural gas and fuel oil for home heating and industrial use caused a drastic decline in coal mining activity. Many mines were inactive until recently when the construction of several large coal-fired power plants created a greatly increased demand.

The uranium boom following World War II brought thousands of prospectors and miners into the more rugged and remote areas of southern Utah and western Colorado. This influx was temporary and most uranium seekers left after the market for uranium declined. Roads and jeep trails established or improved during the uranium boom have had a lasting impact by increasing accessibility to many areas.

Uranium mining and processing, which have been at a low level for a number of years, are beginning to accelerate in response to the increase in nuclear power plants.

Coal is produced in almost half the region's counties and is the leading value mineral in six of them. Of those counties reporting actual dollar volume of production, 60 percent had total production valued at greater than $1 million; and 45 percent had values greater than $10 million.

Petroleum, natural gas, and natural gas liquids were produced in half of the counties and were the leading commodities in one-quarter of the counties, including two counties that had a total mineral production of $340 million. Although sand and gravel were the most common minerals in the region, being produced in 95 percent of the counties, production value was low, accounting for only one percent of Utah's total mineral production. A wide variety of metallic minerals were produced in the region, the most common being uranium. Other metallic minerals included copper, zinc, lead, vanadium, gold, silver, and iron. In addition to sand and gravel, the nonmetallic minerals produced in the region included crushed stone, clay, gypsum, lime, potassium salts, and salt. The demand for limestone and lime is increasing as these materials are used for dust suppression in coal mines and in wet scrubbers for emission control at power plants.

Even though much of the region is sparsely populated and rural in nature, it supports localized urban centers. Price, Richfield, Vernal, St. George and Cedar City, Utah, and Grand Junction and Montrose, Colorado, are some of the principal trade centers within the region. Page and Fredonia, Arizona, and Salt Lake City and Provo, Utah, are within the area of economic influence. Nearly all communities are dependent on Salt Lake City or Denver for some goods and services.

Total population for the Uinta-Southwestern Utah Coal Region was approximately 406,600 in 1975, with a density of approximately seven persons per square mile. Forty-four thousand persons migrated into the region between 1970 and 1976. Public school enrollments totaled over 100,000 students in 1975. Table 4-11 provides an overview of pertinent demographic and socioeconomic information.

Approximately 26,400 workers, or about 19.2 percent of total regional employment, are in the service sector. Combined with 29,900 workers in the wholesale and retail trade sector and 16,700 workers in the manufacturing sector, these three sectors represent over 52 percent of total employment. Approximately 13,460 persons are employed in the agricultural sector in the region.

Livestock grazing in some form occurs over much of the region. The limited area of farm land, less than 5 percent of the land area, is largely used for production of hay and feed grains in conjunction with range livestock operations.

Pastureland represents more than 75 percent of farmlands. Over 75 percent of harvested cropland is irrigated. In some counties, as much as 20-29 percent of the total farm land and most of the irrigated land was used for the production of hay to support livestock operations.

Cultivated crops produced within the region include hay, wheat, sugarbeets, and corn. Average yields per acre for these crops are 2.5 tons for hay, 23.3 bushels for wheat, 18 tons for sugarbeets, and 96 bushels for corn.

Military and other U.S. government installations and operations in and adjacent to the region make a significant contribution to the economy. In recent years the service sector related to tourism and outdoor recreation has become important. Hunting, fishing, camping, plus other recreation-oriented out-of-doors activities are significant elements of the regional economy. Five national parks, five national monuments, one national recreation area, one wilderness area, one national forest primitive area, several BLM outstanding natural areas, numerous ski resorts, and river-

TABLE 4-11

POPULATION AND ECONOMIC CHARACTERISTICS IN THE UINTA-SOUTHWESTERN UTAH REGION(a)

1975 Total Population[a]	406,626
Total Area (square miles)[a]	56,271
Population per square mile (1975)	7.2
Per Capita Personal Income (1975)	$3,950
Per Capita Personal Income as a Percent of National Average (1975)	78

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	6,243	5	31,887	3
Other Agriculture	7,218	5	35,786	3
Metal Mining	1,893	1	13,714	1
Coal Mining	2,167	2	51,511	5
Oil and Gas	2,611	2	24,109	2
Other Mining	1,423	1	15,998	1
Construction	6,608	5	106,707	2
All Manufacturing	16,755	12	149,799	13
Transportation, Communication, and Public Utilities	4,504	3	73,969	7
Wholesale and Retail Trade	29,898	22	198,023	18
Finance, Insurance, and Real Estate	4,168	3	36,770	3
Other Services	26,397	19	190,401	17
Federal Govt.	3,559	3	40,077	4
State and Local Govt.	23,687	17	143,562	13
TOTAL	137,131		1,112,313	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

running opportunities on the Colorado River, all within or immediately adjacent to the region, draw recreationists from throughout the nation.

A significant characteristic of the region is that existing population centers are far apart and often considerable distances from the natural resources that are being developed. Also, availability of land suitable for expanded municipal and residential development is sometimes physically limited by rugged terrain or inadequate water supply.

School districts range from over 13,000 students in 34 schools at Grand Junction, Colorado, to less than 100 students and one school in some smaller rural communities.

In many communities little vacant housing is available to accommodate any substantial population increase. In towns currently experiencing rapid growth there has been a marked increase in mobile homes.

Most towns have small administrative staffs which have few resources for planning future developments. Also, land use control mechanisms to manage growth are frequently lacking.

Police and fire protection range from full time professional departments to part time services of the county sheriff's departments in the smaller communities.

Except for the few major highways most roads were designed a number of years ago to handle relatively light traffic and would require upgrading to accomodate heavy coal hauling. Some coal deposits are accessible only by primitive roads and major road construction would be required if coal were developed. Only a few active railroads exist in the region. Interstate Highway 15 skirts the western edge of the region linking the major trade centers of Utah with Las Vegas and Los Angeles to the southwest and with Boise, Portland, and Seattle in the northwest. Interstate 70 links central Utah with Grand Junction and Denver on the east. Interstate 80, just outside the region, links the Wasatch Front population centers of Utah with the San Francisco Bay area and industrial centers of the Great Lakes and northeastern regions.

Major railroads are the Union Pacific and Denver and Rio Grande Western (D&RGW). The D&RGW begins at Ogden, Utah, passes through Salt Lake City and Provo, crosses the Wasatch Plateau and parallels US 6 to Grand Junction and Denver, Colorado. A segment of the D&RGW extends southward through the region to Richfield, Utah. The Union Pacific links the region to other population centers of the nation.

A preponderance of the land is in public ownership. Portions of nine National Forests are included in the higher, timbered portions of the region. These are the Wasatch, Uinta, Ashley, Fishlake, and Dixie National Forests in Utah and the White River, Routt, Grand Mesa, and Uncompahgre National Forests in Colorado. The Uintah-Ouray Indian Reservation is located in the Uinta Basin portion of the region. Lands at lower elevations are largely public lands administered by the Bureau of Land Management. Typically, bottom lands and gentle slopes suitable for agriculture are privately owned and the more rugged terrain is in public ownership.

4.10 DENVER - RATON MESA COAL REGION

The Denver-Raton Mesa Coal Region is in the Colorado Piedmont and Great Plains of the west central United States. This region encompasses approximately 24,000 square miles in 14 Colorado and one New Mexico counties.

4.10.1 The Environment

The Denver Basin occupies a north-south trending basin characterized by gently dipping strata to the east and by steeply dipping upturned beds along the foothills to the west. Except along the foothills where crystalline rocks outcrop, the surface rocks are sedimentary. The Laramie Formation contains coal beds of sub-bituminous B and C rank. Although these beds range up to 17 feet thick, most are thinner, lenticular, and discontinuous. A number of small mines have extracted coal from this formation, particularly in Boulder and Weld Counties, Colorado, and near Colorado Springs. In addition, the Denver Formation contains extensive beds of sub-bitumnous coal in an area about 75 miles long by 25-35 miles wide. Placer gold was recovered from portions of the area in the latter part of the nineteenth century, but gold is not actively mined now. Numerous producing oil and gas wells are located in the region. Production is from the Dakota Sandstone and is spread over a number of small scattered fields.

The Raton Mesa area of this region occupies a broad trough that runs north-south from northern New Mexico into southern Colorado. This basin is

also characterized by gently dipping rocks on the eastern flank and steeply dipping to overturned rocks along the flanks of the Sangre De Cristo Mountains to the west. The area contains many igneous intrusions that alter the coal beds. Coal occurs throughout the sandstones and shales of the Vermejo Formation and the conglomerate, sandstone, and shale of the Raton Formations. The entire region is estimated to contain 3.9 billion tons of demonstrated coal reserves. The coal is high-volatile A to B bituminous and of coking quality throughout most of the region, except in the Walsenburg Field in the northern part. The coalbearing rocks are up to 2,400 feet thick and contain coal beds mostly 2 to 5 feet thick, but ranging up to 15 feet thick in the New Mexico section of the region. Much of the coal outcrops at the surface on hillsides and along hogbacks. Some surface-mineable coal reserves are reported, but a number of major coal beds of the Vermejo Formation are buried by overburden as thick as 1,000 to 3,000 feet. Sand and gravel are extracted in all counties of the region.

The climate of the Denver-Raton Mesa Coal Region is highland continental. It is characterized by low relative humidity, light rainfall, abundant sunshine, moderate to high wind movement, and a large daily range in temperature. Precipitation generally ranges from 13 to 18 inches a year, the greater amounts falling at the higher elevations. Precipitation is heaviest in spring and early summer and lowest in the winter months.

Prevailing storm patterns across the region are west-to-east. The storms provide little moisture to the area, however, because they deposit most of it on the western slopes of the Rockies. Similarly, storms from the north that bring some of the coldest weather are rarely accompanied by significant precipitation. In spring, when storms tend to develop in the panhandle of Texas and Oklahoma, moisture is deposited on the eastern slopes of the mountains and the area receives the heaviest and most general rains. These taper off to shower and thunderstorm activity in the summer period.

The mean annual temperature in the region ranges between 48° and 52° F. However, daily temperatures vary by 27°F to 39°F, indicative of the high, semi-arid nature of the area and climate.

Surface wind speeds average 10 miles per hour. However, winds through the vertical mixing zone are less than average for the nation as a whole. Frequent night-time surface inversions and relatively high afternoon mixing heights are prevalent features of the region. The terrain and the considerable daily range in temperature tend to create local valley-mountain circulations, so that winds are not very persistent in direction except when chinooks occur. There is a tendency for regular reversals of flow, a situation that is not conducive to dispersing pollutants.

In spite of these factors, overall regional air quality is quite good. However, in the more heavily populated areas along the Front Range, and particularly in the South Platte River Valley, air quality frequently fails to meet national standards. The principal cause is automobile emissions coupled with atmospheric temperature inversions. These conditions are more frequent in the fall and early winter though they may occur at any time of the year.

The region is part of three major drainage basins: the Upper Missouri, the Upper Arkansas Red, and the Western Gulf. The major rivers draining the region include the South Platte and its tributaries, and tributaries to the Arkansas River. Headwaters of these streams lie to the west in the Rocky Mountains where most of the runoff originates as winter snows. Streams originating within the region are ephemeral; any runoff in them is generally from spring and summer thunder showers. Surface-water flow in the region is about 5.4 million acre-feet per year, of which over 4.5 million acre-feet are consumptively used, primarily for irrigation and self-supplied industry.

Aquifers are found both in the alluvial deposits of the Denver and Raton Basins and in the underlying sandstones. Wells drawing from alluvium in the Denver Basin primarily supply water for irrigation and yield 400 to 2000 gallons per minute. The Foxhill Sandstone is the most notable bedrock aquifer in the Denver Basin; it lies at the base of the coal zone of the Laramie Formation. Most wells in the sandstone yield water under artesian pressure, although heavy pumping has lowered the artesian head about 600 feet in some areas. Recharge areas of this aquifer are in the foothills to the west and the Black Forest area near Colorado Springs. In the Raton Basin, the Dakota Sandstone is the principal bedrock aquifer, though water is recovered from other sandstones also. Wells into these sandstones generally yield 10 to 100 gpm, and some yield over 200 gpm.

Water quality in the perennial streams entering the region is quite good, with total dissolved solids averaging less than 100 milligrams per liter. However, ephemeral tributary streams often add water containing 1800 mg/liter or more. Due to this and to return flows water quality deteriorates progressively downstream. For example, the South Platte contains about 1000 mg/liter of dissolved solids where it leaves the region. Similarly, the perennial streams entering the region start with little sediment, but tributary streams, particularly during peak flows, contribute very heavy loads, with the result that, in the eastern part of the region, sediment loads may exceed 1900 mg/liter.

Groundwater quality in alluvial aquifers also tends to deteriorate downstream, increasing from 1300 mg/liter of total dissolved solids near Denver to about 1800 mg/liter near the state line. Quality of water from the sandstone varies but generally is lightly mineralized with a high floride concentration and some is slightly corrosive.

Due to a shortage of available water to meet municipal, irrigation, and industrial needs of the region, extensive importation of water from western Colorado has been undertaken.

Within the Denver section of this region, the soils generally have an organic-rich surface horizon and are high in bases. These gently sloping soils usually have a thin clay accumulation in the subsurface horizon and are intermittenly dry for long periods during the summer. This portion of the region is on the western edge of the prairie biome and the predominant vegetation is buffalo grass and blue grama. Associated vegetation includes yucca, western wheatgrass, needlegrass, fringed sage, and prairie globemallow. Other plants of local importance include cottonwood, willows, and fourwing saltbush along drainage systems; saltgrass on saline or alkaline soils; and prairie sand reed and plains prickly pear in sandy areas. Ponderosa pine is found in areas southeast of Denver generally on northerly and easterly aspects, in the Black Forest north of Colorado Springs, and where the grassland grades to a coniferous forest of ponderosa pine and Douglas fir along the southwest border of the region.

The predominant soils of the Raton Mesa section have a grey to brown surface horizon with a subsurface accumulation of clay, and are medium to high in bases. These soils are usually moist but have steep slopes and many areas with rock outcrops. Soil limitations in this section include erosion, shallowness, and slope. Vegetation is primarily montane coniferous forest of ponderosa pine, Douglas-fir, and Englemann spruce. Pinyon-juniper stands grading into short-grass prairie similar to that in the Denver section are found in the eastern portions of the Raton section.

A high annual turnover and production in the grasslands of the Denver section provide a food base for large variety of animals. Populations of many wild animals can fluctuate widely because of periodic droughts and severe winter storms. Riparian habitats along drainage bottoms extend the forest edge into the grasslands. This greatly increases the variety of habitat available for animals; those requiring heavy cover, shade, browse, tree nesting, etc., are able to survive within the grassland.

Except for a few remaining pronghorn antelope, the original grazing animals have been replaced by domestic livestock. Mule deer are resident where ponderosa pine is found and in the fingers of riparian habitat along stream beds. Whitetail deer are found in the South Platte River bottoms and the deer population is increasing in this section.

Animal life of the Raton-Mesa section is typical of the montane coniferous forest and forest edge habitats. Typical species include mammalian yellow-bellied marmot, golden-mantled ground squirrel, least chipmunk, red squirrel, bushy-tailed woodrat, boreal redback vole, bobcat, mule deer, elk, and porcupine. Typical birds include the western flycatcher, Clark's nutcracker, mountain chickadee, mountain bluebird, and pygmy nuthatch.

There are five animal species in the region whose populations have diminished to the point that they are currently on the Federal list of endangered species: the bald eagle, peregrine falcon, whooping crane, black-footed ferret, and greenback cutthroat trout. There are no plant species presently listed as threatened or endangered, although a number are under consideration.

After disturbance, most areas of the Denver-Raton Mesa Coal Region could probably be reclaimed with proper land management. The principal limiting factor is the uncertainty of precipitation and, in some areas, erodibility of soils.

4.10.2 The Environment And Man

Both sections of the Denver-Raton Mesa Coal Region are associated with important Paleo-Indian life. East of the Raton Mesa section is the Folsom site in Colfax County, New Mexico, the first site to be positively identified as Paleo-Indian. Folsom points, a particular style of projectile point identified with this site, were found in direct association with the remains of an extinct species of bison. North of Denver is the Lindenmeier site, in Larimer County, Colorado. Extensive excavations of this site uncovered over 20,000 artifacts, primarily stone blades and projectile points, and helped to produce a better understanding of Paleo-Indian life. Cultural developments following the aforementioned Paleo-Indian period included the San Jose complex of the Desert Culture in the Raton Mesa section and a transition phase between the Archaic and Desert Cultures in the Denver section. Further developments continued to divide the two sections between eastern and western cultural influences. In the period following 500 A.D., the Denver section was within the cultural sphere of the Plains Bison Hunters, and the Raton Mesa section was part of the Anasazi complex of the southwestern Farmers Tradition. The National Register of Historic Places provides cultural protection for many of these and other important archeological and historical features within the region. Within historic time, eastern Colorado and northern New Mexico were the domain of several successive Indian nations. When the white man arrived in the Denver-Raton Mesa Coal Region, the Arapaho and Cheyenne occupied the plains north of the Arkansas River and the Kiowa and Comanche occupied the land to the south.

Although Spain was the first European nation to claim what is now the Denver-Raton Mesa Coal Region, that nation never established any settlements there. Both soldiers and friars from the settlements near Santa Fe, New Mexico, visited the area beginning in the early 1700's. They generally followed a route over Raton Pass; the same route followed by present day Interstate 25.

Within three years of the Louisiana Purchase, General Pike visited the region on his explorations in 1806. However, it was not until after the Mexican War and the treaty of 1848 that settlement began in the Raton Mesa section. Settlers came to this area primarily from New Mexico beginning in the 1850's and 1860's. By 1850, John Fremont had passed through the Denver section on two of his expeditions, and the Santa Fe Trail had been established through the Raton Mesa section. The discovery of gold near what is now Denver in 1858 brought settlement to that area, primarily from the East. Following the Civil War, the plains Indians were removed to reservations in Oklahoma.

Railroads from Cheyenne and Kansas City both reached Denver in 1870, greatly accelerating the settlement of that part of the region. Denver is the largest city in the region. Of the 110 historic sites within the region that are listed on the National Register of Historic Places, half are within the City of Denver.

Dominant economic activities in the region reflect the position of Denver as a financial, trade, and manufacturing center for the whole Rocky Mountain area, as well as a western government center. Federal, state, and local governments employ 24 percent of the work force. Wholesale and retail trade (23 percent), services (16 percent), and manufacturing (14 percent) together employ 53 per cent of the workers. Table 4-12 describes the major sector socioeconomic characteristcs. Agriculture employs about 2 percent and mining less than 1 percent of the workers. The total labor force, expressed as a percentage of total population, provides an estimate of the labor force participation rate. The estimated 1975 labor force participation rate in the Denver-Raton Mesa Coal Region was 72 percent.

Per capita income for the region in 1975 was $5,787, some 14 percent above the national average of $5,077. Income ranged from a low of $3,228 in Huerfano County, Colorado, to a high of $6,858 in Denver County.

Beyond the metropolitan areas, the principal industry is agriculture. In rural counties, as high as 55 percent of the workers are employed in agriculture. Regional agricultural sales were $908 million in 1975 with over 68 percent of that being livestock, mostly beef cattle. Agriculture of the region can be divided into three separate categories. In northern Colorado, particularly along the South Platte River, there is substantial irrigation and beef production. Principal crops include sugarbeets and grains. In this area, farm products valued at $50-$150 per acre are produced. South of this area there is a shortage of irrigation water, and agriculture is about equally divided between

TABLE 4-12

POPULATION AND ECONOMIC CHARACTERISTICS IN THE DENVER-RATON MESA REGION (a)

1975 Total Population[a]	1,854,205
Total Area (square miles)[a]	23,937
Population per square mile (1975)	77.5
Per Capita Personal Income (1975)	$5,787
Per Capita Personal Income as a Percent of National Average (1975)	114

ECONOMIC SECTOR	EMPLOYMENT	PERCENT OF TOTAL	EARNINGS (in thousands of dollars)	PERCENT OF TOTAL
Livestock	9,632	1	126,143	1
Other Agriculture	8,944	1	109,989	1
Metal Mining	513	0-1	6,781	0-1
Coal Mining	1,177	0-1	13,373	0-1
Oil and Gas	3,498	0-1	110,420	1
Other Mining	2,722	0-1	9,179	0-1
Construction	57,000	7	770,943	8
All Manufacturing	112,279	14	1,515,820	17
Transportation, Communication, and Public Utilities	50,325	6	775,049	9
Wholesale and Retail Trade	182,872	23	1,664,036	18
Finance, Insurance, and Real Estate	44,898	6	565,795	6
Other Services	130,073	16	1,440,159	16
Federal Govt.	87,956	11	1,095,350	12
State and Local Govt.	105,194	13	876,913	10
TOTAL	797,083		9,080,220	

(a) Demographic information which is based on all counties either totally or partially within regional boundaries.

dryland wheat and livestock ranching. In this area, the value of farm products sold per acre of farm land is between $10 and $30. In the Raton Mesa section, cattle and sheep ranching predominate and there are few cultivated crops. The average value of farm products here is less than $10 per acre of agricultural land.

Principal crops grown within the region include wheat, hay, corn, sugarbeets, and cotton. Yields per acre for these crops are approximately 23 bushels of wheat, 3 tons of hay, 101 bushels of corn, 19 tons of sugarbeets, and 380 pounds of cotton. Agriculture employs about 18,576 persons in the region, about half of these being in the livestock industry.

Mining is a relatively minor part of the local industry, with coal mining employing less than one percent of the work force. Historically there have been a number of smaller coal mines both in Boulder and Weld County, Colorado, and in the Raton Basin. Oil and gas production has been the source of greatest extracted wealth with numerous small fields throughout the area. Production of sand and gravel is the most universal of the mineral industries with activity found in every county of the region. Sand and gravel are used almost exclusively for local roads and building construction.

The Denver-Raton Mesa Coal Region is not an area of outstanding outdoor recreation opportunities. It contains no national parks, wild and scenic rivers, or wilderness areas. The region does include eight state recreation facilities and one state park, all in Colorado. These nine areas comprise some 22,000 acres and receive about 2.7 million visits annually.

Upland bird and waterfowl hunting are important fall activities, particularly in the irrigated agricultural lands north of Denver. Similarly, deer are hunted in the forested areas of the Raton Basin. Both sections of the region are on access routes to the Rocky Mountains to the west where many people, both resident and non-resident, travel for recreational activities (hunting, fishing, skiing, hiking, jeeping, mountain climbing, etc.). The most popular recreational activities within the region are camping, fishing, and picnicking.

Because of Denver's historical role as an industrial and trade center and the nearby cities of Colorado Springs and Fort Collins, facilities in the Denver section of the region are well developed. This section is served by good highway and rail systems and a major regional airport.

The area has been one of rapid growth for the past 15 years. Net immigration to the region between 1970 and 1976 was 162,000 persons. Despite this growth, the capacity of most community facilities has kept pace and public services are generally adequate. Some shortages of classrooms are noted in rapid growth portions of the metropolitan areas, but older sections of these same areas are experiencing declining public school enrollments and are facing the prospect of closing schools.

Domestic water supplies are a critical factor in the metropolitan areas. All are dependent to one degree or another on water imported from the western slope of the Rocky Mountains.

To a large extent, the size and nature of community facilities are a function of population density. This is reflected in the contrast between the metropolitan areas of the region and the more rural areas. In the Raton Mesa section of the region, the smaller communities have limited capacity to deal with a population explosion.

Life styles of the Denver-Raton Mesa Coal Region can be logically divided into three main types. First is the metropolitan life style of the Denver metropolitan area which is not unlike other large cities. Many people live in the suburbs and commute to regularly scheduled jobs in the city. The city also offers a full range of cultural activities, from museums to plays and symphony concerts to professional sports events. Because of the relative proximity of the mountains, many metropolitan residents maintain an active interest and participation in outdoor recreational pursuits. Each weekend the highways to the mountains are congested with residents traveling to favorite hiking, camping, skiing, or fishing areas.

Small towns are relatively stable communities where ranchers and merchants know their neighbors. Many cultural activities and spectator-type entertainments are lacking in these areas. Residents are generally quite independent and proud of their chosen way of life.

Between these types of life styles are the small cities such as Colorado Springs and Fort Collins. These communities are large enough to support a reasonable level of cultural and educational services, yet retain much of the small town atmo-

sphere and attitudes, particularly among the long-time residents.

Federal land surface ownership in the region is minimal and widely scattered, amounting to only about 97,000 acres. Over half of this is in Huefano County, Colorado.

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CHAPTER 5

REGIONAL IMPACTS OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

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CHAPTER 5

REGIONAL IMPACTS OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

The environmental impacts of the preferred Federal coal management program and six major alternatives as described in Chapter 3 are presented in this chapter. The impacts are evaluated across the major activities related to the entire coal development cycle: coal extraction; beneficiation; transportation; conversion and utilization; and transmission, distribution, and delivery. Impact levels vary by alternative according to changes in regional coal production and consumption levels.

The first section of this chapter (5.1) presents a general discussion of the methodologies used for the determination and analysis of impacts. The second section (5.2) gives a summary comparison of the regional impacts of the alternatives. Detailed data used to quantify the various impacts are provided in a series of appendices at the end of this statement. Section 5.3 describes the impacts by resource category that could occur under each of the alternatives. Finally, Section 5.4 discusses the impacts of several issue subalternatives which could affect the structure of any Federal coal management program. These subalternatives are based on the issues summarized in Table 3-1.

5.1 IMPACT ANALYSIS METHODOLOGIES

Chapter 3 of this programmatic environmental impact statement identifies seven Federal coal management program alternatives. The factors which most influence the varying levels of impact of the coal management program alternatives are the changes in regional coal production and consumption levels. These levels are used to estimate corresponding distributions of coal throughout the various activities related to coal development. For each activity, quantitative estimates for various environmental, social, and economic factors are then derived by region. Analysis of the impacts is done by assessing the influence of these factors on selected features of the environment. Where quantification of an environmental, social, or economic factor is not feasible, a qualitative discussion is presented.

It should be emphasized that the programmatic nature of this impact statement precludes site-specific analyses. Such analyses will be developed in subsequent regional environmental studies. The focus of this statement, therefore, is on the national and interregional impacts of the coal management program alternatives.

The coal development activities which form the basis of the quantification of the environmental, social, and economic factors are described in Section 5.1.1. General methodological assumptions and guidelines for analysis of impacts are found in Section 5.1.2. Specific assumptions are stated with each impact discussion to ensure appropriate textual interpretation. In Section 5.1.3, a summary of the methodology used to calculate the environmental, economic, and social factors is given. The methodology is described in full detail in Appendix H. In this statement the term "environmental impact" is used interchangeably with "environmental effect." When reference is made to a quantifiable change in some individual feature of the environment, the term "impact factor" is used. When such a change is expressed in terms of a quantified amount (or normalized in the mathematical sense), the term "environmental loading factor" or "impact multiplier" is applied (e.g., pounds of solid waste produced per 100,000 tons of coal mined, or fatalities resulting per billion ton-miles of coal transported). Using the environmental loading factor as a multiplier (i.e., multiplying it by the number of appropriate units involved, such as 100,000 tons of coal mined or billion gross ton-miles of movement) results in a quantitative estimate of the impact.

5.1.1 Coal Development Cycle Activities

The activities that form the basis for analysis of impacts are those which occur from the time the coal resource is identified until the energy in the

coal is used by the consumption sector. As shown in Figure 5-1, the coal development cycle or sequence of coal development activities consists of six major activity areas. The figure also indicates which activities were analyzed with the aid of a computer program developed expressly for this purpose and those analyzed apart from the computer program. Associated with the major activities are a number of subactivities or phases in the coal development cycle. The major subactivity areas and phases are described briefly below. A more detailed discussion is contained in Appendix C, which also includes other information about coal such as how it was formed, its characteristics, and how it is used to meet energy demands. Figure 5-1

5.1.1.1 Coal Extraction. There are two major methods of extracting coal - - underground mining and surface mining. Until about 1950, most underground mining was done by the conventional room and pillar technique. This entails mining coal in a series of rooms with the room separations serving as pillars to support the strata above. After a block, panel, or section has been mined, part of the coal in the pillars can be recovered as a retreat is made toward a main entry to the mine. Since 1950, continuous mining has become widely used. By this technique, an electric-powered machine rips the coal from the entire length of the working face while permitting the excavated sections to collapse behind it. This technique avoids the need to provide separate entries to undercut, drill, place explosives, blast, load, and roof bolt required by the conventional underground method.

Where coalbeds are relatively flat and near the surface as in much of the West, the surface mining method is employed. Here, overlying material is removed in long narrow cuts and the topsoil is segregated by distinct layers termed "horizons." The overburden material is placed into parallel cuts from which the coal has been removed and the topsoil is placed on top. In the East, where the terrain is steep, surface mining is generally accomplished by contour stripping. The overlying materials are removed by proceeding around the hillside, with the overburden cast down the hill. The exposed coal is then removed. This process continues until the overlying material becomes too thick to economically remove.

5.1.1.2 Coal Beneficiation. Two processing options were examined in this activity area of the coal development cycle: (1) crushing and screening and (2) mechanical cleaning. In the context of this analysis, crushing and screening refers to the removal of impurities such as clay, rock, shale, and pyrite. Mechanical cleaning includes operations beyond crushing and screening such as cleaning by pulsating air or by water to separate the coal and impurities [1]. Sometimes only crushing and screening is performed; sometimes both techniques are employed in tandem. Some coal is supplied to consuming areas without being processed, for example to plants which have their own cleaning facilities or which accept run-of-mine coal. Factors used to estimate impacts from crushing and screening and mechanical cleaning, and the amounts of coal to be processed by the two techniques, are discussed in Appendix H.

5.1.1.3 Coal Transportation. This activity area of the coal development cycle addresses conveying coal from the mine to conversion or utilization facilities (e.g., fossil fuel power plants or synthetic fuel plants). The four transport modes considered in the analysis are slurry pipeline, truck, railroad, and barge. In certain instances several transport modes are used for a given coal movement. For example, coal may be hauled from the mine area by off-road vehicles to a unit train and then to a barge loading point. As shown in Appendix H, loading factors to determine environmental impacts are developed for each type of transport.

5.1.1.4 Coal Conversion and Utilization. This part of the coal development cycle includes the conversion of coal for consumptive use. In order to expand the future use of coal, it is anticipated that certain existing gas and oil consuming facilities must convert to coal, and certain new facilities would be built to convert coal into substitutes for oil and gas. The subactivity options considered are use of coal as feedstock for electric power and industrial plants (steam electric option), conversion to substitute natural gas or oil (synthetic gas or synthetic liquid option), and production of coke for industrial processes (coke option). The rationale for allocating consumption to each of these options and the development of the loading factors used to estimate environmental impacts associated with the use of coal in each option are presented in Appendix H. Appendix C contains a more detailed

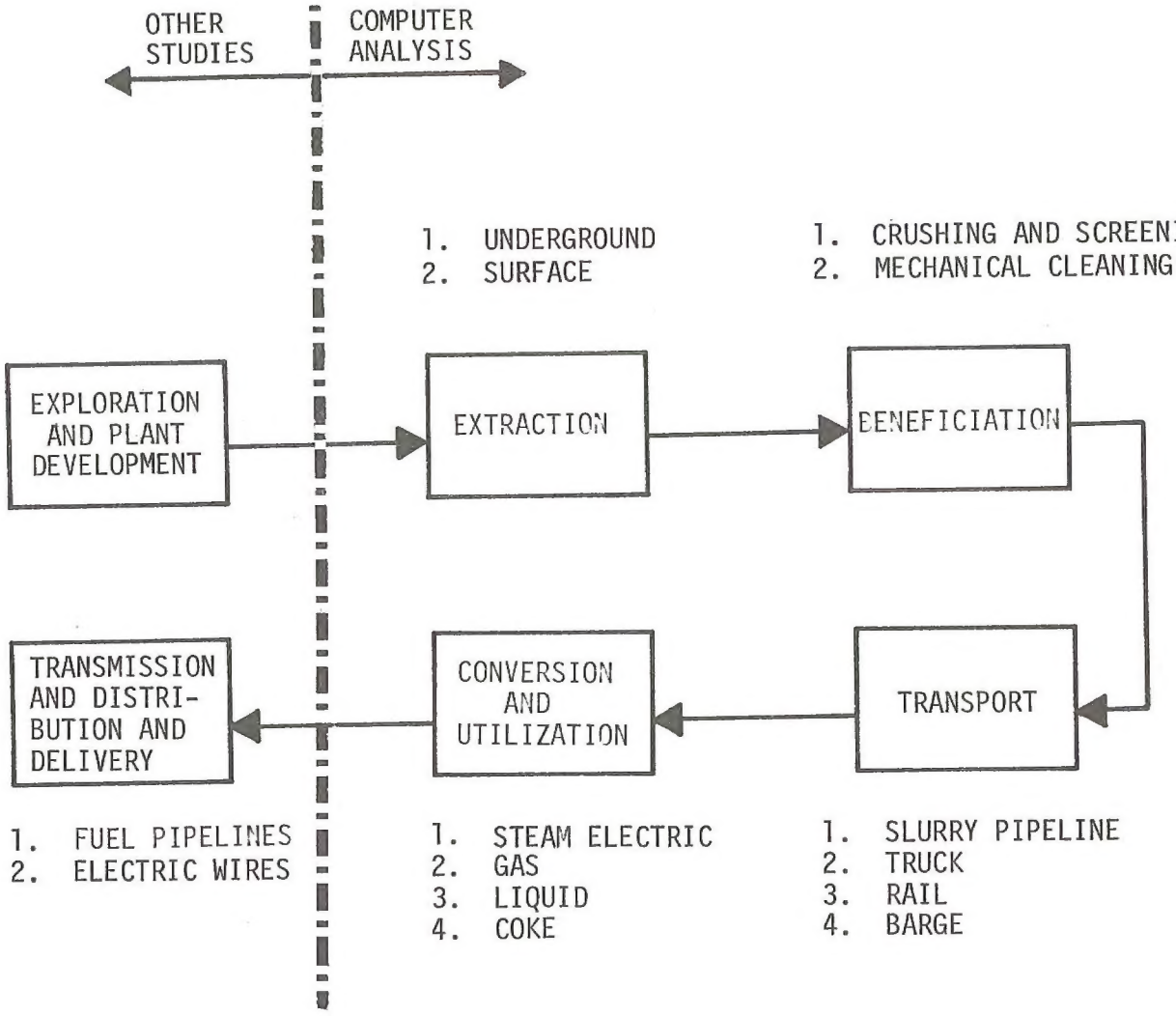


FIGURE 5-1

THE COAL DEVELOPMENT CYCLE

discussion of the processes involved in converting coal to satisfy these options.

5.1.1.5 Transmission, Distribution, and Delivery. This is the final major activity area in the coal development cycle. It involves the delivery of the electric power and substitute natural gas and oil to distribution centers. The two phases considered are the use of electric power lines and fuel pipelines. Factors were used to estimate the environmental impacts associated with constructing additional power lines to tie into an existing grid system and constructing additional pipelines to connect to existing interstate and intrastate pipelines. Appendix H provides the rationale for the loading factors used in this analysis.

5.1.2 Assumptions and Analysis Guidelines

Assumptions used to establish the limits and guidelines for analysis of programmatic impacts are presented in this section. The assumptions are set forth to aid in interpreting the magnitudes of the impacts that are forecasted. They also provide a base for future regional impact analysis forecasts.

5.1.2.1 Assumptions. The assumptions used in this analysis are as follows:

- Coal demand will encourage additional development of coal reserves.
- Coal energy requirements, on a Btu basis by coal consuming states in 1985 and 1990, are based on the Department of Energy's National Coal Model (NCM) demand assumptions (see section 5.1.3 and Appendix H).
- Coal mining and preparation technologies will not change significantly by 1990.
- Conversion of coal to synthetic gas and oil will be a commercial reality by 1985, but on a limited scale. Conversion on a large scale basis is not expected until after the year 2000.
- Labor, equipment, and capital shortages will not significantly distort the projected levels or timing of the Federal coal management program.
- No extensive delays will be encountered in obtaining required Federal, state, and local clearances for the Federal coal management program.
- Reclamation technology will not change significantly by 1990 and the major thrust of reclamation would be to return disturbed land to the contour and use specified in the approved reclamation plan.
- Current best practicable pollution control technology will be used to minimize the emission of air pollutants by 1985.
- Current best available control technology will be used to minimize the release of water pollutants by 1985.
- Development of other resources in the Federal coal regions will not significantly interfere with coal resource development under the Federal coal management program.
- Coal energy demands projected by the Department of Energy for 1985 and 1990 for the high, medium, and low production levels will be met for all Federal coal management program alternatives. If, under a given strategy, production decreases in one or more regions, it would be compensated by increases in other regions.

5.1.2.2 Analysis Guidelines. The following guidelines were used in the analysis of impacts:

- There are twelve basic coal supply regions. For analysis purposes, the Appalachian Coal Region has been divided into three regions–Northern, Central, and Southern.
- Programmatic impacts for these twelve regions are analyzed for two points in time, 1985 and 1990.
- The impacts associated with the no new leasing program alternative closely approximate those of a no-action program alternative.
- The high and low coal production estimates associated with the preferred and no new leasing coal management program alternatives adequately include the possible ranges in coal production levels to be achieved in the 1985 and 1990 time periods.

5.1.3 Impact Estimation

The impact estimation performed in this programmatic statement for the several Federal coal management program alternatives is based to the maximum extent possible on quantification of environmental changes which would result from the operation of the various activities of the coal development cycle.

By necessity, some impacts can only be stated in general terms because of: (1) the absence of knowledge of the exact locations where coal mining and other activities would occur; (2) the lack of adequate methods to perform quantification; or (3) the absence of consistent regional base case information which can be applied uniformly among the twelve coal regions analyzed. A detailed accounting of pollutant- related impacts on specific air sheds or water bodies falls within the first class. Quantification of aesthetic impacts or changes in ecological community composition and diversity are examples of the second class of impacts which may be projected only in a general way.

In order to provide information on the anticipated impacts of a Federal coal management program, several analytical tools have been employed. Output from the Department of Energy's National Coal Model (NCM) has been used as the departure point for determining the quantities of the coal involved in the various activities of the coal development cycle [2]. This model is described in Appendix H.

An allocation methodology (i.e., algorithm) has been employed to adjust the NCM output for use in the present analysis. This algorithm (1) translates the 30 NCM coal production areas and 35 consumption areas to the 41 production areas and 53 consumption areas used in this environmental impact statement; and (2) estimates interregional flows from the 41 production areas to the 53 consumption areas.

The third analytical tool employed in the impact analysis is a computerized program developed for this statement, the Coal Impact Estimation Program (CIEP). This program is summarized below and a detailed description of the procedures employed is presented in Appendix H together with the program's basic inputs (coal production levels, coal transportation flows, coal consumption points and quantities, and environmental loading factors).

5.1.3.1 Derivation of Coal Production and Consumption Levels and Coal Flows. In June 1978, the Department of Energy (DOE) provided the Department of the Interior with the results from the NCM for low, medium, and high levels of coal production in 1985 and in 1990. These computer runs are starting points for the analysis of the seven Federal coal management program alternatives.

The NCM uses a least economic cost methodology to estimate the level of coal production by surface and underground methods within 30 geographic areas. It further allocates this production by type of end use using the most economic transport routes to 35 geographic consuming areas. The primary model outputs are the production and consumption levels in each region and a 30 by 35 origin/destination coal flow matrix (i.e, a table in which the 30 coal producing areas from which the coal originates appear as rows, and the 35 consuming areas to which it is destined appear as columns; the number in each row-column intersection denotes the amount of coal produced in region A that is consumed in region B).

Since the NCM runs address different geographic coal production and consumption areas than used in this statement, it was necessary to translate the NCM outputs into this statement's 41 production areas and 53 consuming areas. In performing this redistribution, it was assumed that neither the proportionality of surface and underground mining nor the split between crushing and screening and mechanical beneficiation would vary from those in the NCM model and that the distribution among end uses of the coal would be a function of the coal energy demand assumptions included in the NCM. The translation and redistribution was manually and judgmentally performed for each of the six DOE projections (low, medium, and high for 1985 and 1990). The results of this effort are six separate 41 by 53 origin/destination coal flow matrices. The row totals of these matrices indicate regional production levels while the column totals represent regional consumption levels.

Given the supply, demand, and coal flow data on a 41 by 53 matrix basis, it was necessary to determine what differences would exist for each of the Federal coal mangement program alternatives: no new Federal leasing, the preferred program, processing of PRLAs only, emergency leasing, lease to meet DOE production goals, lease to satisfy industry indications of need, and state determination of leasing levels.

The low, medium, and high western regional coal production levels for each alternative management program for 1985 and 1990 were derived from the low, medium, and high 1985 and 1990

DOE production projections and a number of other sources of information. In the absence of an established procedure for estimating these regional production levels, decisions have been made based on the information available, including:

- DOE projections.
- Department of the Interior regional environmental impact statements on expansion of existing coal mines and development of proposed new coal mines.
- Coal industry and government forecasts.
- Expected production from approved and pending mine plans.
- Likely production from Federal leases without mine plans.
- Current coal production levels.
- Contractually obligated coal production.
- Coal lands ownership patterns.
- Indian coal ownership.
- Non-Federal coal ownership.

As an example of the judgmental considerations included in this adjustment process, projected production under the no new Federal leasing alternative took into account the amount of coal already available in existing Federal leases and the production potential of these leases. Many existing Federal leases are not expected to be in production by 1985 because of small size, environmental problems, high mining costs, poor quality coal, poor location, or other factors. If any of those leases would not be producing by 1986, it was assumed that they would be cancelled for failure to be diligently developed.

Another important consideration used in estimating the impact of a no new Federal leasing policy is the availability and production potential of non-Federal reserves in a given region. In many instances, non-Federal reserves would not be developed if complementary Federal reserves are not available. Significant portions of the reserves in the western coal regions are contained in checkerboard lands or in scattered blocks where the non-Federal coal holdings are often too small to form mines of economically efficient size without including adjacent Federal coal.

Special computer runs which used the DOE's NCM were made for the no new or restricted leasing alternatives. These runs were made by modifying the supply curves used in the NCM to correspond to the estimated reduced regional coal supplies that would be available under these alternatives. Federal coal not in existing leases and non-Federal coal which requires new leasing of complementary Federal coal to be developed were eliminated from the supply considered available for regional coal development. The NCM was then rerun with this restricted coal supply in order to estimate the impacts on coal production by coal region.

One result obtained from the computer runs is that a number of western coal regions would show increases in coal production as a result of a no new Federal coal leasing policy. These regions already have major supplies of non-Federal coal or coal in existing Federal leases. Hence, when coal production is reduced in other western regions that are more dependent on new Federal leasing to sustain or increase production, some of the loss is displaced to western regions less dependent on new Federal leasing. In particular, the region in which achieving projected production levels is most dependent on new Federal leasing is the Powder River Coal Region in Wyoming and Montana. This region tends to lose production relative to projected levels while other western regions tend to gain production when Federal coal availability is tightly restricted. Production under a no new leasing policy also tends to be displaced to midwestern and eastern regions that have little Federal coal.

There are large reserves of Indian coal in the West. These reserves appear large enough that, were they to be rapidly developed, they could make up for virtually all production deficiencies caused by a no new leasing policy. However, there are many uncertainties relating to development of tribal coal reserves. For example, in Montana, the Cheyenne Indian Tribe has resisted expanded coal development and the Crow Indian Tribe recently cancelled existing coal leases in part on the basis of inadequate royalties. In estimating regional coal production levels for this environmental impact statement, it is assumed that there would not be a large expansion of Indian coal production to make up for production declines caused by a Federal decision not to lease additional Federal coal until at least 1985. However, already planned production from mines on Indian lands is considered part of the available coal supply under a no new leasing policy.

An additional factor complicating projections for the no new leasing and other Federal coal

management program alternatives is the extent to which existing operations could or would expand capacity in response to unsatisfied demands. While it is assumed that this would happen to some extent, the resulting additional production is not specifically quantified.

The distribution of western coal production under each program alternative was determined by the above process. An origin/destination matrix for each alternative was developed. The coal demand in each consuming region was specified by DOE for its runs on a Btu basis for the low, medium, and high DOE production projections for 1985 and 1990. The DOE production projections in each western region are similarly analyzed on a Btu basis, which then allows calculation of the flows in the origin/destination matrix.

Next, for each Federal coal management program alternative, a comparison was made between the Btus of energy produced in each region and that required to meet the DOE established consumption projection for each consuming region. Where differences existed, coal flows in terms of Btus of energy delivered were modified such that the net flow of coal-derived energy into each consumption region was held constant. After a supply-demand Btu equilibrium was again attained, the Btu production and consumption levels and Btu flows were converted back to coal tonnages. The result of this procedure was the generation of new coal flow origin/destination matrices for each alternative.

The last remaining task prior to the calculation of environmental impact factors for each alternative was a split of coal flows by transport mode from each origin (production area) through intermediate transshipment or transfer points to each destination (consumption area). Assumptions were made that the majority of coal movements between states would be by rail, a smaller volume of intrastate shipments within a state would be transported by rail, and the remainder by barge, highway, or slurry pipeline depending on existing and projected transportation facilities of these types.

In contrast to the other activities in the coal cycle (i.e., production and consumption), the characterization of coal flows in terms of tonnage does not result in a clear presentation of environmental impact factors. The measure chosen to determine transportation environmental impact factors was gross ton-miles generated as a result of transporting coal. In this context, gross ton-miles is obtained by summing the following components:

- Net ton-miles – weight of coal times distance moved.
- Tare ton-miles – weight of transportation equipment utilized times round trip distance from mine to destination and return.

The inclusion of tare weight gives recognition to the fact that trains, trucks, and barges which haul coal also generate environmental impacts during the return trip to the coal mine or loading facility.

For each Federal coal management program alternative and production level, the methodology developed to estimate the level of gross ton-miles generated consisted of:

- Development of the origin/destination matrices for the gross tonnages of coal flows from producing regions to consuming regions.
- Identification of probable routes and length of route within each state between origin and destination.
- Calculation of the number of trips and coal tonnage flows within each state.
- Combination of volume of coal flow, distance, and transport mode to estimate gross ton-mileage generated per state and per region.

All of the above information formed the basis for estimation of environmental impact factors generated by the several Federal coal management program alternatives. The factors were enumerated through the use of another computerized procedure developed specially for this programmatic environmental impact statement. The outputs of this program, the Coal Impact Estimation Program (CIEP), were employed to determine the potential environmental impacts described later in this chapter.

5.1.3.2 Overview of the Coal Impact Estimation Program. The CIEP is designed to be highly flexible and reactive to the Federal coal management program alternatives for which impact estimates are required. As presently contemplated, it could be a major component of the Federal coal management program, and would employ specific levels of coal production and consumption in separate geographic areas. These levels are combined with the distributions of coal flowing into

each major activity in the coal development cycle and the results are multiplied by impact multipliers which correspond to environmental impact factors per 100,000 tons of coal or billion gross ton-miles. The impact factors treated in the CIEP are presented in Table 5-1.

An overview of the major modules within the CIEP is presented in the following sections. A more detailed description of the CIEP assumptions and structure is presented in Appendix H. The CIEP consists of the three major modules described below.

Main Impact Estimation Module. The Main Impact Estimation Module uses coal production and consumption estimates for each region of the country to produce numerical estimates of the resulting major environmental impacts. This is done by expressing coal production and consumption levels as flows through the coal development cycle. Once quantities of coal flowing into each activity in the coal cycle are determined for each geographic area, the environmental impact multipliers are applied to produce the following estimates:

- Air pollution – total suspended particulates (TSP), hydrocarbons (HC), carbon monoxide (CO), sulfur oxides (SO_2), nitrogen oxides (NO_x) and carbon dioxide (CO_2).
- Water use – makeup (effluent and evaporative loss).
- Disturbed acreage.
- Operational and construction employment.
- Solid wastes – active and inert.
- Accidents/Fatalities.
- Operating energy.

Estimates of the level of change of environmental impacts in each category for each geographic area and activity in the coal development cycle are produced by this module. These estimates are then used as input into either the socioeconomic or the ecological impact estimation modules of the CIEP.

Socioeconomic and Ecologic Impact Estimation Module. There are two major modules in the CIEP. The first makes use of estimates of the requirements for construction and operational workers at each activity of the coal development cycle to produce estimates of total population, infrastructure demands, and fiscal requirements on a regional basis. The second uses the acreage disturbed throughout the coal development cycle, on both a long and short term basis, to produce estimates of agricultural productivity losses and decreases in wildlife habitat and total carrying capacity. Both modules produce impact estimates on an activity-by-activity basis for the production, transportation, and consumption elements of the coal development cycle. This feature identifies the estimated impact effects of mining and beneficiation, of transportation, and of consumption of coal by geographic area.

5.1.3.3 Coal Impact Estimation Program Inputs. The five major classes of coal-related information required to operate the CIEP are:

- Production levels.
- Transportation levels.
- Consumption levels.
- Coal development cycle flow distribution.
- Environmental impact multipliers.

The first four classes of information have been described in the foregoing sections. They are discussed in greater detail in Appendix H. The remaining input is presented below.

Environmental Impact Multipliers. Environmental impact multipliers are used to identify and quantify the social, economic, and environmental factors related to coal extraction, beneficiation, transportation, conversion, and utilization. These impact multipliers relate specific impacts to a 100,000 ton unit of coal. This approach is used in all activities in the coal development cycle with the exception of transportation. In the transportation area, estimates are made per billion gross ton-miles. By generally expressing all impacts in terms of tons of coal, impact estimates are made once coal production and consumption levels are determined. Even though some states would have no coal production, they could have transportation, conversion, and utilization flows resulting in environmental, social and economic impacts. Impact multipliers used as input to the main portion of the Coal Impact Estimation Program are defined for the major categories shown in Table 5-1. These multipliers vary for the 41 producing regions, overlain with 53 consuming regions. Additional multipliers are used for a broad range of social, economic, and environmental parameters incorporated into the subroutines of the CIEP.

TABLE 5-1

COAL IMPACT ESTIMATION PROGRAM

PROGRAM MODULE	DESCRIPTION OF IMPACT FACTOR
Main Impact Estimation Module	Air Emissions: Total suspended particulates Hydrocarbons Carbon monoxide Sulfur oxides Nitrogen oxides Carbon dioxide
	Water Use: Makeup (effluent and evaporative loss)
	Land Disturbed: Short term Long term
	Solid Wastes: Active (scrubber waste, treatment residuals, etc) Inert (ash, slag, rock, etc.)
	Accidents Fatalities Operating Energy Direct Construction Employment Direct Operational Employment
Socioeconomic Impact Estimation Module	Indirect Construction Employment Indirect Operational Employment Dependents Total Population School Age Children Teachers Classrooms Physicians Hospital Beds Housing Units Water Treatment Sewage Treatment Solid Wastes Policemen Firemen
Ecological Impact Estimation Module	Land Disturbed: Cropland Pasture Range Forest Wetlands

TABLE 5-1
(Concluded)

COAL IMPACT ESTIMATION PROGRAM

PROGRAM MODULE	DESCRIPTION OF IMPACT FACTOR	
Ecological Impact Estimation Module (Continued)	Productivity Lost:	Corn Soybeans Cotton Wheat Sugar beets Oats Hay Grass Timber Marshland Animal units
	Biota Disturbed:	Mule deer Antelope Moose Elk Deer Small mammals Song birds Game birds Predators Reptiles

5.1.3.4 Program Output. The CIEP produces estimates of impacts that can be reported according to analytical needs. The output reports can be presented geographically, by category, or by activity in the coal development cycle.

The program has the capability of subtotalling impact estimates for several distinct geographic areas, and aggregating and displaying the results on a regional basis. Examples of this capability include the aggregation of the separate portions of Colorado in the Green River-Hams Fork, Denver-Raton Mesa, San Juan River and Uinta-Southwestern Utah Coal Regions into estimates for the State of Colorado. The program also produces aggregate estimates for a total coal region (e.g., the Powder River Coal Region made up of the Powder River, Montana, and Powder River, Wyoming geographic areas). An additional optional report generated by the CIEP presents the level of coal flows into each activity in the coal development cycle.

The flexibility of the CIEP is demonstrated further by the ability to incorporate additional options in the output reports. The first feature allows estimates of impact levels accompanying various Federal coal management program alternatives to be compared to one another at a given point in time. The program output, when this feature is selected, represents the difference between the impact levels generated by the two alternatives. Program reports based on this output can be used for a rapid comparison of the broad effects of the alternatives in question. The second feature of the program is that it produces estimates of the change in environmental impacts for a specific program alternative between two points in time. The output feature of the CIEP is currently structured to produce impact estimates for the periods 1976 to 1985 and 1985 to 1990.

5.1.4 Other Impacts

The variability of potential impacts associated with certain resource categories precludes analysis in these areas on a quantitative basis. Because elements that influence the degree of impacts on these resources vary at individual locations, impacts at the programmatic level can only be described in general for each of the various activities of the coal development cycle. The resource categories in this case include topography, geology, minerals, soils, archaeological and historical resources, and recreation. In addition, several resource impact categories can only be described generically.

5.2 REGIONAL IMPACTS SUMMARIES

This section contains summaries of the environmental, social, and economic impacts associated with the various Federal coal management programs. Section 5.3 contains a more detailed analysis of program effects, organized by impact area. This section presents a comparison of the effects of 10 representative impact areas for each of the 12 Federal coal regions. The 10 impact areas selected are as follows:

- Coal Production.
- Coal Consumption.
- Land Committed (independent of reclamation).
- Agriculture (value of crops lost).
- Population (coal-related only).
- Disabling Accidents (those resulting in man-days lost).
- Water (required to support the Federal coal management program).
- Game Animal Losses.
- Particulate Emissions (total suspended particulates).
- Sulfur Oxide Emissions.

Each of the above impact areas is examined on an annual basis for 1985 and 1990. For purposes of summarizing, each impact is presented as the percent change between the no new leasing (base case) alternative and the other six Federal coal management program alternatives.

A positive percent change (+) means that the impacts forecast for a Federal coal management program alternative exceed those forecast for the no new leasing base case. A negative percent change (-) means that the impacts forecast for a Federal coal management program alternative are less than those forecast for the base case. The percent changes thus signify the extent to which developments under a Federal coal management program alternative relate to those developments, under the no new leasing base case, from ongoing or prospective coal mining on private and public land already leased for, or otherwise committed to, coal mining. Whereas Section 5.3 (below) addresses impacts as a function of three coal production levels (low, medium, and high), only impacts associated with the medium coal produc-

tion level are addressed in this summary section. The medium level impact projections for the 10 impact areas are presented in a single table for each of the 12 coal regions. Percent changes in the ranges 10 to 19, 20 to 29, and greater than 30 percent between the no new leasing baseline and the six program alternatives are highlighted in these tables. As in Section 5.3 that follows, the differences between program alternatives are based on regional coal production and consumption projections derived from the NCM and on quantified estimates of environmental, social, and economic impact factors provided for each region by the Department of the Interior's Coal Impact Estimation Program (CIEP). The environmental impacts of each alternative in each region will be a function of the combination of effects attributable to the production, transportation and use of coal and site-specific factors in each region. Accordingly, the reader of this summary section should refer to Section 5.3 (and related appendices) for details about the impact assessment process.

The material contained in the 12 regional summary tables has been aggregated to permit the reader to observe how differences for the 10 impact areas vary across the coal regions. Tables 5-14 to 5-17 (following Section 5.2.10). display these differences.

5.2.1 The Appalachian Coal Region

As discussed in Chapter 4, Description of Regional Environments, the Appalachian Coal Region extends over nine eastern states and contains an estimated 103 billion tons of coal reserves. For purposes of the presentation in this environmental impact statement, the region has been divided into three regions which are referred to as the Northern, Central, and Southern Appalachian Coal Regions.

Tables 5–2, 5–3, and 5–4 provide estimates of the ten impact areas selected for discussion in this summary section. As shown in these tables, impacts projected for 1985 will generally decrease under the six Federal coal management program alternatives as compared with the no new leasing base case. In 1990, the trend is reversed and the impacts tend to increase. For the preferred alternative, coal production and consumption in 1985 and 1990 does not vary from the baseline case in the Northern Appalachian Coal Region and varies only slightly in the Central and Southern Appalachian Coal Regions.

The socioeconomic characteristics of the three regions differ widely. The Northern and Southern Appalachian Coal Regions currently employ a very small portion of their total labor forces in coal-related industries (about six percent). Thus, more significant impacts in terms of numbers of persons involved would be anticipated in the Central Appalachian Coal Region as coal production and/or consumption caused coal-related populations to change.

No significant impacts are projected for the Northern Appalachian Coal Region in 1985 for any of the program alternatives considered. In 1990, for all alternatives considered, with the exception of the preferred program and the lease to meet DOE goals alternatives, related population levels are projected to increase by more than 11 percent (+11.3 to +23.3 percent). These population increases are anticipated primarily as a result of shifts from surface mining to more labor-intensive underground mining techniques.

Significant changes in population are projected in the Central Appalachian Coal Region in 1985 under the lease to meet industry needs alternative, the lease to meet DOE goals alternative and the state determination of leasing levels alternative (-59.3, -10.2 and +24.9 percent, respectively). These population changes are projected to occur as a result of anticipated production changes (increased production for the meet industry needs and meet DOE goals alternatives, decreased production for state determination alternatives). In 1990, only the lease to meet industry needs and lease to meet DOE goals alternatives are projected to result in significant impacts in the Central Appalachian Coal Region. Population changes under these alternatives are projected to vary by +11.2 percent and -13.7 percent, respectively, from 1990 base case conditions. These changes are anticipated as a result of projected production changes for the two program alternatives identified.

The increase in coal-related population in 1990 under the preferred alternative for the Southern Appalachian Coal Region primarily results from a shift from surface mining to underground mining, the latter being more labor-intensive.

For the lease to meet industry needs alternative, significant increases in coal production are estimated for the Southern Appalachian Coal

TABLE 5-2

REGIONAL IMPACT SUMMARY
NORTHERN APPALACHIAN COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case(a)	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	211.7	0	0	0	+ 0.6	0	+ 0.2
Coal Consumption (million tons)	182.9	0	- 4.9	- 4.9	- 4.9	0	- 4.9
Land Committed (acres)	25,870	0	- 2.8	- 2.8	- 3.0	0	- 2.9
Agriculture (thousands 1974 $)	5,073	0	- 2.8	- 2.8	- 3.0	0	- 2.9
Population (thousands)	137.6	- 0.1	7.3	- 7.3	- 7.7	- 0.1	+ 7.8
Disabling Accidents	6,978	+ 0.2	+ 0.4	+ 0.4	+ 0.9	+ 0.3	+ 0.5
Water (thousand acre-feet)	563.8	0	- 4.4	- 4.4	- 4.4	0	- 4.4
Game Animal Losses	18,110	0	- 2.8	- 2.8	- 2.8	0	- 2.9
Particulate Emissions (tons)	131,713	0	- 2.9	- 2.9	- 3.0	0	- 3.0
Sulfur Oxide Emissions (tons)	213,649	0	- 3.8	- 3.8	- 3.6	0	- 3.7
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	219.4	+ 0.3	0	0	- 0.7	+ 1.3	+ 2.6
Coal Consumption (million tons)	210.1	0	- 4.9	- 4.9	0	0	- 4.9
Land Committed (acres)	28,125	+ 0.1	0	0	- 0.2	+ 0.4	+ 0.6
Agriculture (thousands 1974 $)	2,758	+ 0.1	0	0	- 0.2	+ 0.4	+ 0.6
Population (thousands)	108.4	+ 1.8	+12.0	+12.4	+11.3	+ 6.2	+25.3
Disabling Accidents	882.1	+ 0.7	+ 0.2	+ 0.2	+ 0.9	+ 1.3	+ 1.5
Water (thousand acre-feet)	651	0	0	0	0	0	0
Game Animal Losses	9,845	+ 0.1	0	0	- 0.2	+ 0.4	+ 0.6
Particulate Emissions (tons)	153,266	+ 0.1	0	0	- 0.1	+ 0.3	+ 0.5
Sulfur Oxide Emissions (tons)	255,337	+ 0.1	0	0	+ 0.1	+ 0.1	- 0.1

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

TABLE 5-3

REGIONAL IMPACT SUMMARY
CENTRAL APPALACHIAN COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	205.5	+ 0.5	0	+ 0.3	- 6.3	- 1.0	+ 2.6
Coal Consumption (million tons)	56.4	0	0	0	0	0	0
Land Committed (acres)	15,796	- 0.7	- 0.2	- 0.5	- 4.0	- 0.8	- 1.2
Agriculture (thousands 1974 $)	1,086	- 0.6	- 0.3	- 0.5	- 4.0	- 0.8	- 1.2
Population (thousands)	30.5	- 6.6	- 1.0	- 4.3	-39.3	-10.2	+24.9
Disabling Accidents	6,160	0	+ 0.4	+ 0.1	- 3.3	0	+ 2.2
Water (thousand acre-feet)	212.1	- 0.7	- 0.5	- 0.5	- 1.1	- 0.4	- 0.4
Game Animal Losses	11,060	- 0.7	- 0.3	- 0.5	- 4.0	- 0.8	+ 1.2
Particulate Emissions (tons)	66,282	- 0.6	- 0.3	- 0.4	- 2.6	- 0.5	- 0.7
Sulfur Oxide Emissions (tons)	124,106	- 0.7	- 0.5	- 0.6	- 0.4	- 0.3	- 0.6
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	211.2	- 2.3	- 0.3	- 0.5	- 3.8	- 2.6	+ 6.7
Coal Consumption (million tons)	84.7	0	+ 1.8	0	0	0	- 2.7
Land Committed (acres)	18,662	- 1.0	+ 1.0	- 0.2	- 0.4	- 1.2	+ 1.1
Agriculture (thousands 1974 $)	642	- 0.9	+ 1.1	- 0.2	- 0.5	- 1.2	+ 1.1
Population (thousands)	76.9	- 7.0	+ 2.9	- 0.4	+11.2	- 6.5	-13.7
Disabling Accidents	6,714	- 1.0	0	0	- 2.0	- 0.8	+ 4.1
Water (thousand acre-feet)	309.8	- 0.1	+ 1.7	0	+ 0.6	- 0.2	- 2.1
Game Animal Losses	6,530	- 1.0	+ 1.1	+ 0.2	- 0.4	- 1.2	+ 1.5
Particulate Emissions (tons)	85,967	- 0.6	+ 1.1	- 0.2	- 0.6	- 0.7	- 0.3
Sulfur Oxide Emissions (tons)	185,674	0	+ 1.8	0	- 0.9	0	- 2.6

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

TABLE 5-4

REGIONAL IMPACT SUMMARY
SOUTHERN APPALACHIAN COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	27.5	- 3.2	- 3.6	- 0	+ 14.9	- 19.6	- 16.3
Coal Consumption (million tons)	106.0	- 2.0	- 1.6	- 1.6	- 1.8	- 3.2	- 1.7
Land Committed (acres)	15,301	- 2.0	- 1.5	- 1.4	0	- 5.2	- 3.2
Agriculture (thousands 1974 $)	1.712	- 2.0	- 1.6	- 1.4	+ 2.8	- 5.3	- 3.2
Population (thousands)	88	- 4.8	- 4.1	- 2.3	+ 6.5	- 15.8	- 11.9
Disabling Accidents	939	+ 2.1	- 1.4	+ 0.5	+ 11.3	- 16.7	- 10.1
Water (thousand acre-feet)	355.1	- 1.9	- 1.3	- 1.6	- 1.7	- 3.4	- 1.7
Game Animal Losses	10,710	- 2.5	- 1.6	- 1.4	0	- 4.7	- 3.2
Particulate Emissions (tons)	77,501	- 1.9	- 1.4	- 1.4	- 0.8	- 4.0	- 2.2
Sulfur Oxide Emissions (tons)	110,509	- 1.8	- 1.2	- 1.5	- 1.5	- 3.1	- 1.5
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	26.4	- 3.7	- 0.3	0	+ 15.1	- 45.0	- 46.2
Coal Consumption (million tons)	118.0	0	+ 1.2	0	+ 0.5	0	- 1.4
Land Committed (acres)	16,311	- 0.3	+ 0.9	+ 0.1	+ 1.6	- 3.4	- 4.7
Agriculture (thousands 1974 $)	913	- 0.3	+ 0.9	+ 0.1	+ 1.6	- 3.4	- 4.7
Population (thousands)	26.7	+13.9	+25.1	+11.6	+ 18.6	- 32.6	- 65.2
Disabling Accidents	1,097	- 0.5	+ 0.2	+ 0.2	+ 10.1	- 24.1	- 26.7
Water (thousand acre-feet)	392.6	0	0.9	0	0.6	- 0.3	- 1.6
Game Animal Losses	5,710	- 0.4	+ 0.9	0	+ 1.6	- 3.4	- 4.7
Particulate Emissions (tons)	85,373	- 0.1	+ 0.1	0	+ 1.2	- 1.8	- 3.2
Sulfur Oxide Emissions (tons)	122,861	0	+ 0.9	0	+ 0.6	+ 0.2	- 1.3

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

Region (+14.9 percent in 1985 and +15.1 percent in 1990). This is attributed to an industry preference for expanding production for both underground and surface mining in this region. For the lease to meet DOE production goals and state determination of leasing levels alternatives, significant decreases in production are estimated in both 1985 and 1990 for the Southern Appalachian Coal Region; associated directly with the production decreases are the forecasted population decreases.

As addressed in Section 4.1.1 above, the frequency and persistence of atmospheric inversions in the Appalachian Coal Regions tends to aggravate air quality problems. National Ambient Air Quality Standards for sulfur dioxide and suspended particulate matter are being currently exceeded in the heavily industrialized and mined areas in the regions. As shown in the tables, air emissions associated with the six Federal coal management program alternatives for 1985 and 1990 should have a negligible impact on ambient air quality in the regions as compared with the impacts associated with the base case for the same years.

Since the three coal regions have an abundant supply of surface water, and groundwater does not play as significant a role in the survival of man, plants, and animals as in the West, water use under the Federal coal management program is not an important consideration. Natural primary productivity (what the land produces without human intervention) is moderate to high in the three coal regions (8.9 tons per acre per year in forests to 17.8 tons per acre per year in flood-plain areas); this productivity rate in combination with excellent climatic conditions results in a high potential for reclamation of coal-disturbed land within the regions.

5.2.2 The Eastern Interior Coal Region

This coal region is primarily located in Illinois with smaller portions in Indiana, Kentucky, and Iowa. The Eastern Interior Coal Region contains an estimated 88.9 billion tons of coal reserves which are predominately low-volatility bituminous in rank. As shown in Table 5–5, percent changes in impacts associated with the Federal coal management program alternatives over the no new leasing (base case) alternative are slight. All of the program alternatives except for the lease to meet industry needs and the state determination of leasing levels alternatives show little or no real change.

With its favorable precipitation patterns and two major waterways (Mississippi and Ohio Rivers), the coal region generally has plentiful supplies of water. Although some communities have had difficulty obtaining wells yielding quality water supplies at reasonable costs, fresh groundwater in at least small to medium quantities is not generally difficult to develop. Additional water required to support implementation of any of the Federal coal management program alternatives is not considered a significant problem.

The region has supported extensive agricultural development in the past. Much of the natural vegetation has been removed and only about 15 percent of the region is forested. Accordingly, most wildlife in the region is compatible with man's activities. Little impact on land use, agriculture, and wildlife is thus forecast as a result of any of the Federal coal management program alternatives. Furthermore, the ecosystems within the region should adequately recover from program impacts. With proper soil conditions, natural succession is expected to return grasslands to a near original state within a decade.

A minor increase in production is forecast for the preferred program in 1985 (1.7 percent increase over the no new leasing basecase). This is paralleled by a minor increase in the coal-related population (two percent increase). These impacts should not cause major problems for the region's existing economy and social structure since coal production has traditionally played an important role in the region's industrial development. In point of fact, these trends are shown to reverse in 1990, indicating that coal-related activities in the Eastern Interior Coal Region are not dependent upon the Federal coal management program; the extent of these activities is dependent upon what has been forecast for the no new leasing base case.

5.2.3 Western Interior Coal Region

Major portions of this coal region are located in Missouri, Iowa, Kansas, and Oklahoma; minor portions are located in southeast Nebraska and northwest Arkansas. The Western Interior Coal Region has an estimated coal reserve base of approximately 15.6 billion tons. This reserve base is mostly high-volatility bituminous coal. There is

TABLE 5-5

REGIONAL IMPACT SUMMARY
EASTERN INTERIOR COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	206.1	+ 1.7	0	+ 0.4	- 4.8	- 1.3	- 3.1
Coal Consumption (million tons)	154.4	- 0.2	- 0.3	- 0.3	+ 0.3	- 2.5	- 0.6
Land Committed (acres)	26,295	+ 0.5	- 0.2	0	- 0.8	- 2.4	+ 0.4
Agriculture (thousands 1974 $)	20,997	+ 0.5	- 0.2	0	- 0.8	- 2.4	+ 0.4
Population (thousands)	185	+ 2.0	- 0.4	+ 0.4	- 6.5	- 4.3	+ 4.1
Disabling Accidents	3,976	+ 2.0	0.1	+ 1.2	- 2.0	- 0.2	+ 2.8
Water (thousand acre-feet)	516.6	- 0.1	- 0.3	+ 0.2	0.1	- 2.6	- 0.5
Game Animal Losses	15,780	+ 0.5	- 0.2	0	- 0.8	- 2.5	+ 0.4
Particulate Emissions (tons)	150,165	+ 0.2	- 0.2	- 0.1	- 0.7	- 2.6	+ 0.1
Sulfur Oxide Emissions (tons)	357,462	- 0.2	- 0.3	- 0.3	+ 0.5	- 3.0	- 0.7
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	331.5	- 3.5	- 5.1	- 1.0	-14.1	- 5.7	-14.9
Coal Consumption (million tons)	173.3	+ 0.6	+ 0.8	+ 0.2	+ 0.8	+ 1.0	- 0.5
Land Committed (acres)	28,393	- 1.2	- 1.0	- 0.8	- 4.4	- 3.0	- 3.9
Agriculture (thousands 1974 $)	11,336	- 1.2	- 1.0	- 0.7	- 1.3	- 3.0	- 3.9
Population (thousands)	236.6	- 8.4	-10.3	- 2.9	-21.9	- 4.2	-25.2
Disabling Accidents	6,804	- 2.0	- 3.5	- 0.3	-10.3	- 3.4	+12.4
Water (thousand acre-feet)	578.6	- 0.2	- 0.2	- 0.6	- 0.7	0	- 0.2
Game Animal Losses	8,529	- 1.3	- 1.1	- 0.8	- 4.5	- 3.0	+ 3.9
Particulate Emissions (tons)	180,039	- 0.9	- 1.4	- 0.6	- 3.6	- 0.8	- 3.2
Sulfur Oxide Emissions (tons)	391,309	0	+ 0.2	- 0.5	+ 0.3	+ 0.4	- 1.1

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

some coking coal located in Arkansas and Oklahoma.

Following general trends exhibited in the other eastern coal regions, impacts associated with the Federal coal management program alternatives are shown, with one exception, to be less than those associated with the no new leasing (base case) alternative. As shown in Table 5–6, impacts associated with the state determination of leasing levels alternative are projected to exceed the base case significantly. This is a reflection of the increased coal production in 1985 (+11.2 percent) and in 1990 (+37.3 percent).

The region has traditionally supported agriculture as the dominant land use. However, although coal is plentiful in the region, production is principally in eastern Oklahoma where the region's less productive agricultural areas are currently located.

Due to the nation's energy problems of recent years, coal production which had been steadily declining has revived and is now near the maximum annual production rate reached in 1920. Both water and land based transportation systems used by coal mining activities are adequate to support increased demands in this regard. Thus, the region has already initiated many of the changes (i.e., labor force, social structure, transportation systems) needed to accommodate increasing dependence on coal as an economic base. Environmental impacts associated with the implementation of the preferred Federal coal management program would thus be minor. Since the region has an adequate water supply and the climate is generally favorable, ecosystems native to the region are able to regenerate well. This is a desirable feature of this coal region; it implies that land that has been disturbed due to coal-related activities will rapidly regain natural primary productivity.

5.2.4 The Texas Coal Region

This region consists mostly of a portion of east Texas and a small portion of northwest Louisiana. Currently, the region's lignite reserves are estimated to be 3.3 billion tons. Other significant mineral resources such as petroleum and natural gas are also present.

As indicated in Table 5–7, all key impact areas for the preferred program alternative and most impact areas for the state determination of leasing levels alternative are shown to increase in 1985; in 1990, all six program alternatives show a decrease in impact areas as compared with the no new leasing base case.

With respect to 1985, impacts for the preferred program due to increased production may be significant. Although the region receives about 48 inches of precipitation per year in the northeast, only 16 inches are received in the southwest. As a result, the southwest is relatively arid and periodic droughts are experienced. Generally, groundwater is abundant and of good quality; very high yields (over 1,000 gallons per minute) have been obtained from both bedrock and alluvial aquifers. The ecosystems within the region are not particularly fragile so that a fair degree of disruption can be tolerated with an eventual return to a natural state. Finally, the region has a gently rolling topography which is not especially vulnerable to erosion. For these reasons, the land disturbed as a result of a Federal coal management program can be adequately reclaimed.

No major development of the region's lignite deposits has occurred to date. Thus, forecasts of production increases in the region in 1985 under the preferred program will require changes in the region's industrial development pattern. The region currently exports more oil and gas than it consumes, and this export demand has stimulated development of a transportation network accommodating the transport of bulk commodities, as well as people and the necessities of life. Industrial growth has been termed phenomenal and an adequate labor pool is considered to be available to support the demands of a Federal coal management program.

5.2.5 The Powder River Coal Region

This coal region includes portions of Montana and Wyoming. The region contains about 142.5 billion tons of sub-bituminous coal. The beds are thickest in the northern parts of the region (Montana). Most of this coal lies in near-surface beds that are readily amenable to surface mining.

As shown in Table 5–8, significant impacts are forecast for the region in 1990, with one exception, for all Federal coal management program alternatives. Except for the state determination of leasing levels alternative, where a decrease in production is projected, percent changes in production range from +3.6 percent (emergency leasing only) to +47.5 percent (lease to meet industry needs).

TABLE 5-6

REGIONAL IMPACT SUMMARY
WESTERN INTERIOR COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	14.2	- 4.2	- 3.5	0	+42.2	-23.9	+11.2
Coal Consumption (million tons)	106.9	- 4.0	- 5.4	- 5.0	- 1.5	+ 3.1	- 5.3
Land Committed (acres)	16,386	- 4.1	- 5.3	- 4.7	- 6.0	0	+14.7
Agriculture (thousands 1974 $)	6,648	- 4.1	- 5.3	- 4.6	- 6.0	0	+14.7
Population (thousands)	99.8	- 5.9	- 7.6	- 6.5	- 6.5	+ 0.7	+21.4
Disabling Accidents	808	- 1.1	- 1.1	- 0.8	- 7.5	- 5.9	+ 3.7
Water (thousand acre-feet)	367.4	- 4.0	- 5.5	- 5.0	- 1.6	+ 2.9	- 5.3
Game Animal Losses	4,920	- 4.3	- 5.3	- 4.7	- 6.1	0	+14.6
Particulate Emissions (tons)	121,554	- 3.8	- 5.0	- 4.6	- 1.6	+ 2.5	- 4.7
Sulfur Oxide Emissions (tons)	466,072	- 3.9	- 5.2	- 4.8	- 1.2	+ 2.9	- 5.1
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	25.5	-32.9	-24.3	- 5.1	-60.0	-60.3	+97.3
Coal Consumption (million tons)	170.2	+ 2.9	+ 0.5	+ 0.5	+ 5.9	+ 5.2	- 2.9
Land Committed (acres)	25,876	- 2.6	- 3.8	- 2.4	- 1.7	- 2.8	- 3.1
Agriculture (thousands 1974 $)	5,249	- 2.6	- 3.8	- 2.4	+ 1.7	- 2.8	- 3.0
Population (thousands)	150.4	- 0.3	- 1.9	+ 0.7	- 1.1	- 7.6	- 0.1
Disabling Accidents	1,366	-12.4	- 9.4	- 2.1	-22.4	+21.7	+15.3
Water (thousand acre-feet)	580.2	- 0.1	- 2.4	- 2.4	+ 2.8	2.1	- 5.7
Game Animal Losses	3,080	- 3.2	- 4.7	- 0.5	- 2.1	- 3.4	- 4.0
Particulate Emissions (tons)	194,025	- 0.4	- 2.4	- 2.2	+ 2.0	+ 1.4	- 4.9
Sulfur Oxide Emissions (tons)	714,331	0	- 2.2	- 2.2	+ 2.9	+ 2.3	- 5.5

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

TABLE 5-7

REGIONAL IMPACT SUMMARY
TEXAS COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case(a)	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	64	+ 3.5	+ 0.4	+ 0.9	-21.5	- 9.8	+22.8
Coal Consumption (million tons)	137.7	+ 0.4	- 0.8	- 0.4	- 1.3	- 0.4	2.2
Land Committed (acres)	23,707	+ 1.1	- 0.7	- 0.2	- 5.7	- 2.4	+ 6.5
Agriculture (thousands 1974 $)	2,289	+ 1.1	- 0.7	- 0.1	- 5.7	- 2.4	+ 6.6
Population (thousands)	182.3	+ 1.1	- 0.8	- 0.2	- 5.0	- 2.2	- 6.5
Disabling Accidents	997	0	- 0.3	- 0.1	+ 2.5	- 0.5	+ 2.4
Water (thousand acre-feet)	471	+ 0.4	- 0.8	- 0.4	- 1.5	- 0.5	+ 2.2
Game Animal Losses	14,270	+ 1.1	- 0.7	- 0.1	- 5.6	- 2.4	+ 6.5
Particulate Emissions (tons)	107,280	+ 0.6	- 0.8	- 0.3	- 2.7	- 1.1	- 3.6
Sulfur Oxide Emissions (tons)	108,499	+ 0.4	- 0.8	- 0.8	- 1.4	+ 0.2	- 1.3
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	119.4	-27.6	- 2.5	- 3.0	-50.6	-33.3	- 7.0
Coal Consumption (million tons)	247.3	+ 1.6	0	+ 0.2	+ 0.2	+ 1.1	+ 0.3
Land Committed (acres)	43,684	- 6.0	- 1.8	- 1.7	-12.1	- 7.6	- 2.6
Agriculture (thousands 1974 $)	2,109	- 6.0	- 1.8	+ 0.4	-12.1	- 7.6	- 2.6
Population (thousands)	259.4	-10.2	- 2.9	- 3.2	-14.3	- 9.6	-11.1
Disabling Accidents	1,408	- 1.3	- 8.4	- 0.6	- 1.4	- 0.3	- 1.3
Water (thousand acre-feet)	850.7	- 0.2	- 1.7	- 1.4	- 1.9	- 0.8	- 1.4
Game Animal Losses	13,105	- 6.0	- 1.8	- 1.7	-12.1	- 7.6	- 2.5
Particulate Emissions (tons)	196,903	- 2.1	- 1.7	- 1.5	- 5.0	- 2.9	- 1.8
Sulfur Oxide Emissions (tons)	197,164	0	- 1.6	- 1.3	- 1.3	- 0.4	- 1.3

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

TABLE 5-8

REGIONAL IMPACT SUMMARY
POWDER RIVER COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case(a)	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	204.8	0	0	0	+ 9.8	0	+10.3
Coal Consumption (million tons)	16.6	0	0	0	+ 2.4	- 1.8	- 1.8
Land Committed (acres)	8,426	+ 0.2	0	+ 0.1	+ 8.1	- 0.4	- 7.8
Agriculture (thousands 1974 $)	23	0	0	0	+ 8.7	0	- 8.7
Population (thousands)	112.3	+ 0.5	+ 0.1	+ 0.3	+11.7	+ 0.1	-10.4
Disabling Accidents	619	- 5.0	+ 0.2	- 1.3	+ 1.9	- 5.0	-12.1
Water (thousand acre-feet)	71.6	0	0	0	+ 4.2	- 1.4	- 3.5
Game Animal Losses	3,410	0	0	0	+ 7.9	- 0.3	- 7.9
Particulate Emissions (tons)	38,171	+ 0.6	+ 0.1	+ 0.2	+ 7.8	- 0.1	- 6.4
Sulfur Oxide Emissions (tons)	13,337	- 0.1	- 0.1	0	+ 3.4	- 1.0	- 1.3
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	305.0	+31.1	+16.3	+ 3.6	+47.5	+29.8	-11.7
Coal Consumption (million tons)	26.9	+ 2.6	+ 1.1	0	+ 4.1	+ 2.6	- 1.1
Land Committed (acres)	12,535	+23.1	+11.6	+ 2.1	+35.6	+22.2	- 9.3
Agriculture (thousands 1974 $)	18	+22.2	+11.1	0	+33.3	+22.2	-11.1
Population (thousands)	91.1	+78.3	+39.1	+ 7.6	+102.4	+76.3	-12.5
Disabling Accidents	886	+ 8.9	+12.9	+ 1.2	+ 18.2	+ 9.0	-15.7
Water (thousand acre-feet)	90.1	+ 7.6	+ 3.4	- 0.6	+ 12.7	+ 7.3	- 5.5
Game Animal Losses	2,530	+23.5	+11.8	+ 2.8	+ 4.3	+22.5	+ 9.1
Particulate Emissions (tons)	48,963	+24.1	+11.8	+ 2.5	+ 35.7	+23.3	- 8.5
Sulfur Oxide Emissions (tons)	16,161	+ 2.1	+ 0.4	- 1.1	+ 4.3	+ 2.7	- 3.2

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

Impacts associated with the preferred program are especially significant (31.1 percent production increase and 78.3 percent population increase, for example).

Several features of the region magnify the severity of the impacts shown in the table for 1990. Seventy-five percent of the region's average annual precipitation of 14 inches falls between April and September; flooding is common in the spring when rapid snow melt produces heavy run-off. Though the region is classified as semi-arid, it varies from humid in some years to arid in others and is never predictable. Thus the climate of the coal region militates against attempts to minimize the consequences of disturbing the land and to maximize its subsequent reclamation.

Air quality in the region is generally good. However, the changes in 1990 in particulate emissions projected for the preferred program (+24.1 percent), lease to meet industry needs alternative (+36.7 percent), and lease to meet DOE production goals alternative (+23.3 percent) indicate that air quality in this coal region may be severely degraded should any of these alternatives be implemented.

Surface water and groundwater quality are both variable. Although such water may be chemically suitable to support Federal coal management program activities, the quantity of water available for such activities may be limited.

Ranching and farming are the predominant lifestyles in the region; however, exploitation of oil, gas, and uranium resources has spurred mining developments in recent years. Although population growth has been generally slow in recent years, stability has been disrupted on a local basis by the boom town phenomenon, with Gillette and Sheridan, Wyoming, being notable examples. As a result of increased demands for water, labor, and land associated with developments under the Federal coal management program, the stability of existing lifestyles and socioeconomic structure in the coal region is threatened.

5.2.6 The Green River-Hams Fork Coal Region

This coal region is composed of two contiguous coal regions (Green River and Hams Fork) in extreme western Wyoming, northwestern Colorado, and small portions of Utah and Idaho. Total reserves are estimated to be 15.6 billion tons in the Green River-Hams Fork Coal Region. The coal beds in southwestern Wyoming and northern Colorado range in thickness from a few inches to about 40 feet. Most of this coal is deeply buried and it is not considered economical to extract it using current mining technologies. The coal beds in the rest of the region (western Wyoming, Utah, and Idaho) range up to 100 feet thick with some high quality coals up to 20 feet thick. Steep dips, however, make mining of these beds difficult.

As indicated in Table 5–9, coal production in 1990 in this region due to implementation of the preferred program is forecast to increase substantially (+21.5 percent) over the no new leasing (base case) alternative. Correspondingly significant increases in population (+51.3 percent), land committed (+16.7 percent), and particulate emissions (+12.9 percent) are also indicated for 1990. The impacts associated with the preferred program in 1985 are not as large as those in 1990 (+5.2 percent for production, +7.3 percent for population, for example), but they still pose a threat.

There is wide variation in the magnitudes of impacts forecast for the region in both years among the Federal coal management program alternatives. Under the state determination of leasing levels alternative, coal production in the region would be severely constrained. For the lease to meet industry needs and lease to meet DOE production goals alternatives, the reverse is true; production would be greatly emphasized and all impacts would be correspondingly magnified. In terms of coal production and impacts, the preferred program strikes a balance between the extremes associated with these three alternatives.

Although overall regional air quality is very good, there are localities like Craig, Colorado; Sweetwater County, Wyoming; and Soda Springs, Idaho, where particulates concentrations exceed national standards. It is difficult to relate the particulate emission increases forecast for 1985 and 1990 to particulate concentrations without being site-specific and performing detailed air quality studies. However, it can be stated that the increases in particulate emissions shown for the preferred program will degrade air quality; air quality in localities that are near to or exceed national standards for particulates may be further degraded.

A serious problem is expected in supplying the water needed to support preferred program activities. Though many of the large streams in the

TABLE 5-9

REGIONAL IMPACT SUMMARY
GREEN RIVER - HAMS FORK COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	76.0	+ 5.2	+ 2.5	+ 1.3	+47.3	+47.3	-24.3
Coal Consumption (million tons)	18.0	+ 2.7	- 1.1	0	+ 6.1	- 4.4	- 1.1
Land Committed (acres)	8,210	+ 4.4	+ 1.3	+ 1.0	+36.1	+35.6	-17.7
Agriculture (thousands 1974 $)	58	+ 5.2	+ 1.7	+ 1.7	+36.2	+36.2	-17.2
Population (thousands)	45.4	+ 7.3	+ 2.9	+ 1.5	+49.1	+48.0	-21.6
Disabling Accidents	312	- 1.3	+ 3.5	- 0.3	+30.4	+27.9	+32.7
Water (thousand acre-feet)	66.7	+ 2.9	- 0.6	+ 0.3	+ 9.0	+ 7.6	- 0.8
Game Animal Losses	1,650	+ 4.8	+ 2.4	+ 7.9	+37.0	+36.4	-16.4
Particulate Emissions (tons)	17,758	+ 3.8	+ 1.0	+ 0.8	+26.2	+25.2	-11.4
Sulfur Oxide Emissions (tons)	14,062	+ 2.1	- 0.7	+ 0.2	+ 6.1	+ 4.1	+ 0.5
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	98.7	+21.5	+ 2.3	+ 5.5	+51.9	+51.4	-36.3
Coal Consumption (million tons)	18.1	+11.0	+ 1.7	+ 0.6	+14.4	+11.0	+ 0.6
Land Committed (acres)	9,822	+16.7	- 0.8	+ 1.9	+41.6	+40.4	- 3.2
Agriculture (thousands 1974 $)	35	+17.1	0	+ 2.9	+40.0	+40.0	- 2.9
Population (thousands)	24.0	+31.3	- 6.7	+ 1.2	+44.6	+41.7	-45.0
Disabling Accidents	447	-10.1	+ 3.6	+ 3.8	+30.0	+28.9	-16.3
Water (thousand acre-feet)	58.6	+ 2.9	- 7.7	- 8.2	+ 9.0	+ 6.2	-12.6
Game Animal Losses	955	+17.3	- 1.0	- 2.1	+42.9	+42.4	-32.0
Particulate Emissions (tons)	19,693	+12.9	- 0.9	+ 0.5	+31.3	+30.3	-23.5
Sulfur Oxide Emissions (tons)	14,545	+ 1.2	- 5.1	- 5.8	+ 4.1	+ 2.4	- 6.8

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

region are perennial (like the Green and Yampa Rivers), most of the tributaries are intermittent. The region is thus subject to droughts. Groundwater found in alluvial deposits is of good quality and moderate yields can be obtained. However, pumping from these aquifers is restricted by the states because of appropriated water rights or interference with nearby stream flows. Yields from sandstone aquifers and limestone aquifers are highly variable depending upon permeability. In general, water quality throughout the region has not been fully explored. Not only is the water impact forecast a very real concern because of the water availability and water quality issues, but also because of the constraints it may impose on other non-coal related development activities in the region.

The region contains vast public lands and large ranches, and a low population density (2.6 persons per square mile (1975 data)). Construction of additional housing has not kept pace with demand and there is currently a housing shortage in many of the region's communities. The large increase in coal-related population for 1990 (+51.3 percent over the no new leasing base case) will aggravate this situation unless appropriate measures are taken.

The agricultural sector currently accounts for 10 percent of the region's work force. The value of agricultural crops lost due to mining is forecast to be significant in 1990 (+17.1 percent increase over the base case). Serious changes in the lifestyles of residents in the region have occurred in some areas. These changes will continue whether or not local workers leave agricultural employment for employment in activities related to a Federal coal management program.

There have been recent increases in the levels of development of natural resources in the region, particularly coal, trona, oil, and gas, which have influenced the creation of new communities. The lifestyles of the new residents and their reliance on industry for employment opportunities have combined to alter the typically western character of the region. Since forecasts associated with implementation of the preferred program show increases in coal production, population, water demands, and land committed over the no new leasing base case, it is expected that the character of the region will be altered even more.

Considerable land area is projected to be disturbed for roads, utility corridors, and coal facilities. Since the region consists of a series of parallel mountain ranges and valleys, reclamation of coal-disturbed lands is highly site-specific. Because of the varying topography, soil types, and precipitation rates in the region, the reclamation process is further complicated.

5.2.7 The Fort Union Coal Region

The largest coal region in the Northern Great Plains Province, the Fort Union Coal Region, includes portions of eastern Montana, northwestern South Dakota, and western North Dakota. Significant amounts of coal are located in this region. Reserves of 440 billion tons of lignite, ranging to 1500 feet thick, are estimated in the South Dakota and Montana portions of the region. About 23.1 billion tons of subbituminous reserves are estimated to be surface-mineable from North Dakota westward into Montana.

Table 5–10 indicates the extent of the impacts projected for the Federal coal management program alternatives. The table shows that, in 1985, coal production under the preferred program would not change from the level of the no new leasing base case. The other impact areas (except for disabling accidents) are shown to increase in 1985, some significantly. The explanation for these seeming inconsistencies is that although coal production remains constant under the preferred program, coal consumption in the coal region increases significantly (+11.6 percent); the increases in population, water, air emissions, and other impacts are associated with the projected operation of a modest-sized synthetic fuels high-Btu coal gasification plant within the region. By 1990, coal production in the region under the preferred program is forecast to be much less (-17.8 percent) than that associated with the no new leasing base case, while coal consumption remains the same as the base case. As a result, in 1990 the impacts in other key areas are much less than the base case. These may or may not be desirable impacts, however, depending upon the economic stimulation generated and the stresses that the local social and economic structures would have to endure.

Under the state determination of leasing levels alternative, production is slated to be greater in 1985 over the preferred program (+17.2 percent).

TABLE 5-10

REGIONAL IMPACT SUMMARY
FORT UNION COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	31.9	0	0	0	+15.6	-31.3	+17.2
Coal Consumption (million tons)	19.8	+11.6	+11.6	+11.6	+17.7	+2.5	+18.2
Land Committed (acres)	4,190	+ 7.5	+ 7.5	+ 7.5	+17.9	-11.3	+18.8
Agriculture (thousands 1974 $)	265.0	+ 7.5	+ 7.5	+ 7.5	+17.7	-11.3	+18.9
Population (thousands)	22.4	+12.1	+12.5	+12.5	+31.3	-18.3	-31.3
Disabling Accidents	378	0	0	0	+6.1	-6.9	-16.9
Water (thousand acre-feet)	55.5	+14.2	+14.2	+14.2	22.3	1.8	22.7
Game Animal Losses	1,780	+ 6.7	+ 6.7	+ 6.7	+16.8	-11.8	+18.5
Particulate Emissions (tons)	12,017	+10.7	+10.7	+10.7	+21.0	-5.5	+21.1
Sulfur Oxide Emissions (tons)	12,110	+ 7.1	+ 7.1	+ 7.2	+12.9	+1.4	+11.6
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	51.0	-17.8	- 7.0	- 0.7	+1.7	-35.8	+6.6
Coal Consumption (million tons)	44.8	- 1.8	- 0.4	+0.2	+ 4.7	-11.1	+ 0.9
Land Committed (acres)	8,517	- 5.8	- 1.3	+ 1.3	+5.1	-25.6	+4.3
Agriculture (thousands 1974 $)	269	- 5.9	- 1.1	+ 1.1	+5.2	-25.7	+4.1
Population (thousands)	60.2	-15.9	- 8.8	- 4.7	-6.3	-33.6	-9.5
Disabling Accidents	538	- 2.6	- 1.3	- 0.3	+2.4	-8.4	-0.2
Water (thousand acre-feet)	141.7	- 0.5	+ 1.5	+ 2.5	6.7	-12.6	3.6
Game Animal Losses	1,805	+ 5.8	- 1.4	+ 1.1	+4.7	-25.8	+3.9
Particulate Emissions (tons)	27,832	- 3.0	+ 0.4	+ 2.2	+6.0	-18.6	+4.2
Sulfur Oxide Emissions (tons)	23,435	- 0.3	+ 1.0	+ 1.5	+5.3	-6.8	+1.8

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

This is due to the preference of North Dakota to intensify development of its coal resources. Relative increases in population under the program alternatives reflect a move towards greater overall industrialization in the region. For the lease to meet industry needs alternative, the same general comments apply. The situation reverses itself for the lease to meet DOE production goals alternative where coal production is forecast to be reduced significantly as compared to both the no new leasing base case and the preferred program. As regards these three alternatives (lease to meet industry needs, lease to meet DOE production goals, and state determination of leasing levels), the preferred program strikes a balance between the impact extremes.

Air quality in the region is well within National Ambient Air Quality Standards, especially for particulates and sulfur dioxide. Increased air emissions in 1985 resulting from greater coal consumption under the preferred program will degrade this air quality. However, since these impacts cannot be quantified until specific sites have been studied, it cannot be said that air quality in the region will reach or exceed National Ambient Air Quality Standards.

Groundwater is available throughout the region but only in small to moderate amounts. Surface water is limited throughout the region, except for those areas adjacent to the Missouri and Yellowstone Rivers. Water availability could cause severe problems depending upon where the coal-related activities are sited. The greatest potential for groundwater development is along the Missouri and Yellowstone Rivers and from the deep coal bearing formations themselves.

The infrastructure of the region is typically rural western. Increases in social demands associated with the preferred program due to the population influx projected for 1985 will strain limited service facilities. Agriculture, presently a dominant pursuit in the region, may have to give way to coal-related industrial developments. The lifestyles of the older residents may be adversely affected by coal resource developments and new residents.

5.2.8 The San Juan River Coal Region

This region covers the Four Corners area of the southwest including portions of New Mexico, Colorado, and Utah. The total estimated reserve base in the San Juan River Coal Region is 4.2 billion tons. Coals within the region rank from high-volatile A to B bituminous, to discontinous and dirty coals that are high-volatile C to B bituminous with high ash content.

As presented in Table 5–11, percent changes in key impact areas for the preferred program as compared with the no new leasing base case are essentially negligible in 1985 and significantly lower in 1990. This indicates that the major coal-related impacts to be felt in the region in these years would result from mining on existing Federal leases and from mines not dependent on Federal coal. There is some variation in projected impacts among several of the other Federal coal management program alternatives. Under both the lease to meet industry needs and the state determination of leasing levels alternatives, significant production increases from additional mining are indicated for 1985 (+20.9 percent and +29.0 percent, respectively, over the base case). As expected, production increases result in additional land disturbed, an influx of people for the region, and more particulate emissions due to fugitive dust from the surface mining activities. To the opposite extreme, the lease to meet DOE production goals alternative would result in a large decrease (-10.8 percent) in coal production. Other key impact areas for this alternative decrease accordingly.

The quantity and quality of water required to support any additional developments in the region, let alone the demands projected under the no new leasing base case, are a crucial issue. The region is essentially a desert environment. The quality of groundwater, where it can be found, is only fair. Currently, pumping to support coal and uranium mining in the Gallup, New Mexico area exceeds aquifer replacement capabilities. Annual precipitation is generally less than 10 inches for most of the region. An aggravating factor is that potential evaporation exceeds normal precipitation many times over. Only the San Juan River receives flow from outside the region. Surface reservoirs have been constructed to store the region's water and to control the floods created by summer thunderstorms and spring snowmelt. From a water consumption viewpoint, the preferred program requires less water in 1990 than the no new leasing base case.

Impacts of the preferred program on the region's air quality and its lifestyles are forecast to

TABLE 5-11

REGIONAL IMPACT SUMMARY
SAN JUAN RIVER COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	24.8	+0.8	0	0	+20.9	-10.8	+29.0
Coal Consumption (million tons)	8.9	0	0	0	-1.1	-13.5	-1.1
Land Committed (acres)	3,100	+0.3	-0.2	-0.2	+13.2	-11.4	+18.6
Agriculture (thousands 1974 $)	2	0	0	0	0	0	0
Population (thousands)	12.8	+1.6	-0.8	-0.8	+26.6	-27.3	+35.2
Disabling Accidents	186	+1.1	+0.5	+1.1	+10.8	-5.4	+12.4
Water (thousand acre-feet)	32.6	0	-0.5	-0.5	0.8	-13.3	1.3
Game Animal Losses	50	0	0	0	+20	+20	+20
Particulate Emissions (tons)	9,891	+0.3	-0.4	-0.4	+6.6	-12.3	+9.2
Sulfur Oxide Emissions (tons)	7,327	0	-0.5	-0.5	-0.1	+12.5	-0.2
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	59.4	-15.8	-7.5	-1.6	+1.0	-2.8	+6.0
Coal Consumption (million tons)	13.4	+ 1.5	+ 1.5	0	+ 0.7	+ 1.5	- 1.5
Land Committed (acres)	6,430	-11.2	-5.2	-1.4	+1.0	-3.9	+4.2
Agriculture (thousands 1974 $)	2	0	0	0	0	0	0
Population (thousands)	44.3	-15.8	-6.1	-1.6	-6.3	-11.5	-5.4
Disabling Accidents	337	-7.1	-3.3	-0.3	+2.1	0	+3.3
Water (thousand acre-feet)	41.6	-0.9	-0.6	-1.0	0.4	-0.7	-1.2
Game Animal Losses	50	-10	0	0	0	0	+10
Particulate Emissions (tons)	16,264	-5.9	-2.2	-0.9	+2.0	-14.4	+5.3
Sulfur Oxide Emissions (tons)	8,127	+0.7	0	-1.1	+0.3	-1.1	-2.2

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

be negligible. Any undesirable impacts associated with the preferred program in these impact areas or any of the others will be relatively equivalent to those projected for the no new leasing base case.

5.2.9 The Uinta-Southwestern Utah Coal Region

Included within this region are portions of Colorado and Utah. The region is characterized by extremely steep slopes and narrow vertically-walled canyons. At least 7.2 billion tons of coal reserves are estimated to be in the region, with most deposits in the flanks of major peaks and plateaus. Coal mining, which until recently had declined because of competition from natural gas and fuel oil, has become active again after being spurred by energy shortages. Several large coal-fired power plants have been constructed in the region.

Table 5–12 presents comparative data on key impact areas for the Federal coal management program alternatives and the no new leasing base case. Production projected for the preferred program is shown to be slightly greater (+1.3 percent) than the base case in 1985. This greater production is accompanied by increases in other impact areas. In 1990, the impacts associated with the preferred program are much less than those for the base case because of the lower coal production (-15.8 precent).

Several of the program alternatives show wide swings in impacts as compared to the preferred and no new leasing alternatives. For the lease to meet industry needs alternative, an increase in production of five million tons in 1985 (+18.2 percent change over the base case) is forecast to be accompanied by large impacts in land disturbance, population growth, and air quality. Conversely, the lower production (-10.8 percent) associated with the lease to meet DOE production goals alternative is accompanied by much less severe impacts in these other areas.

Air quality is currently well within National Ambient Air Quality Standards in rural areas of the region. Problems do exist, however, in closed valleys where industrial and urban emissions become trapped. Although the emissions impacts for the preferred program are forecast to be slight in 1985 (+2.3 percent change over the base case for particulates and +2.6 percent for sulfur oxides), there will be some degradation of air quality. The other Federal coal management alternatives are also forecast to adversely affect regional air quality. Since coal operations will take place where adverse temperature inversions are expected to occur, localized problems are likely to be experienced in 1985. In 1990, air quality impacts associated with the six Federal coal management program alternatives are forecast to be negligible.

As regards water impacts, most streams in the region diminish in size as they flow from the mountains. This seeming contradiction is due to a combination of low precipitation coupled with high evaporation, and diversions for irrigation. Tributaries originating at lower elevations are intermittent. As compared with the no new leasing base case, the six Federal coal management program alternatives are forecast not only to draw down more of the existing short supplies in the region in 1985 but, also to further degrade water quality by subjecting more land to erosion. Similar impacts on water quality and quantity in 1990 are estimated to be negligible as compared with the base case.

The region experienced a uranium boom following World War II. When the demand eased, the uranium-induced population left the area. The increase in coal-related population under the preferred program is nominal (+2.4 percent change over the base case), but in a region so sparsely populated and rural in nature the impact could be significant. Housing stocks used by the uranium boom-induced population have deteriorated such that existing, habitable stocks of vacant housing are inadequate to meet the needs of projected coal-induced population increases. Existing population centers are far apart and distant from the coal deposits. Many communities have housing shortages and social services are limited.

The availability of facilities to transport coal to markets is limited in the region. Highway and rail systems must undergo extensive development by 1985 to support increased coal-related development activities associated with a Federal coal management program.

5.2.10 The Denver-Raton Mesa Coal Region

This coal region consists of portions of Colorado and New Mexico. The Denver Basin part of the region contains coal beds up to 17 feet thick in the Laramie Formation; extensive coal beds also exist in the Denver Formation in an area about 75 miles

TABLE 5-12

REGIONAL IMPACT SUMMARY
UINTA-SOUTHWESTERN UTAH COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	29.6	+1.3	+1.3	+0.3	+18.2	-10.8	-0.6
Coal Consumption (million tons)	17.8	+2.8	+0.6	+1.1	+3.9	+2.8	+2.8
Land Committed (acres)	2,793	+2.8	+0.7	+1.1	+6.6	+0.6	+2.1
Agriculture (thousands 1974 $)	4	0	0	0	0	0	0
Population (thousands)	42.2	+2.4	+1.2	+0.9	+19.2	-9.0	+0.9
Disabling Accidents	748	+0.9	+0.7	+0.7	+14.7	-8.4	+0.9
Water (thousand acre-feet)	61.8	2.7	0.3	1.1	4.4	2.2	2.7
Game Animal Losses	280	+3.8	+3.8	+3.8	+7.1	+3.8	+3.8
Particulate Emissions (tons)	15,422	+2.3	+0.6	+0.9	+7.9	-1.1	+1.8
Sulfur Oxide Emissions (tons)	16,841	+2.6	+0.3	+0.1	+3.9	+2.7	+2.7
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	45.0	-15.8	-7.5	-1.6	+1.0	-2.8	+6.0
Coal Consumption (million tons)	**20.6**	**+ 5.8**	**- 0.5**	**+ 0.5**	**+ 6.8**	**+ 5.8**	**+ 1.5**
Land Committed (acres)	3,439	-11.2	-5.2	-1.4	+1.1	-3.9	+4.2
Agriculture (thousands 1974 $)	2	0	0	0	0	0	0
Population (thousands)	37.1	-15.8	-6.1	-1.6	-6.3	-11.5	-5.4
Disabling Accidents	1,097	-9.9	-15.2	-0.4	+7.4	-29.3	-13.6
Water (thousand acre-feet)	70.8	0	-5.8	-4.8	1.9	-1.8	-4.5
Game Animal Losses	175	-10.0	0	0	0	0	+10.0
Particulate Emissions (tons)	20,548	-5.9	-2.2	-0.9	+2.0	+14.4	+3.5
Sulfur Oxide Emissions (tons)	19,713	+0.7	0	-1.1	+0.3	+ 0.6	-2.2

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

long by 30 miles wide. In the other part of the region, Raton Mesa, coal beds are mostly two to five feet thick, ranging to 15 feet. Much of this coal outcrops but surface-mineable reserves are low. A number of the beds are under overburden 1,000 to 3,000 feet thick. The region is estimated to contain about 3.9 billion tons of demonstrated reserves.

In 1976, the region's consumption of coal far surpassed its production (5.2 million tons consumed, 1.9 million tons produced). As presented in Table 5–13, this trend is forecast to continue in 1985 and 1990 under the preferred program but at much higher absolute levels. In 1985, 20 million tons are estimated to be consumed and five million tons produced. In 1990, 30.3 million tons would be consumed and 10 million tons produced. Whereas the same tonnage would be produced in 1985 as the no new leasing base case, positive impacts greater than the base case are shown because of the increase in consumption. These impacts are considerably less than those associated with three of the other Federal coal management program alternatives (lease to meet industry needs, lease to meet DOE production goals, and state determination of leasing levels). The impacts may be significant depending upon where site-specific activities take place. The increases in air emissions and land committed for the preferred program are attributable to greater coal consumption within the region than are associated with the base case. In other words, the preferred program forecasts greater industrial development that depends upon coal as an energy source.

Overall regional air quality is quite good; however, there are areas where it fails to meet National Ambient Air Quality Standards. This degradation is primarily due to automotive emissions coupled with temperature inversions. Under the preferred program, air quality would be degraded in the region. Without knowing the location of the pollutant sources it cannot be said that resulting air quality on a regional basis would be bad.

Water is in short supply in the region. Water is imported from western Colorado to meet regional municipal, irrigational, and industrial needs. The demands for water to support a Federal coal management program in 1985 would aggravate the situation.

The region has seen rapid population growth during the last 15 years (about a 35 percent increase). Public and service facilities in the Denver portion of the region are well-developed and probably can be expanded to meet coal development requirements. However, this is not the case in the Raton Mesa section of the region where communities are small and less able to handle rapid growth.

5.3 PROGRAM IMPACTS

This section discusses in greater detail than the summaries in Section 5.2 the impacts that could result from implementing the various alternatives for a Federal coal management program. To provide a proper perspective, the analysis first examines how much coal will be produced and consumed in each region under each of the program alternatives. This introductory material is then followed by detailed analyses of impacts in the following categories: physical, ecological, socioeconomic (urban effects), transportation system, and operating energy requirements. Each subsection discusses a particular category of impact for the various regions and a particular category of impact under the different program alternatives. Although impacts are discussed individually, they are interrelated. For example, land disturbance results in habitat loss, productivity loss, and other physical impacts. Likewise, population changes frequently lead to impacts on employment, health and safety, recreation, and income accruing to local governments through taxation.

Impacts are analyzed for two program time frames, 1985 and 1990, and are related to a base year, typically 1976. For each Federal coal management program alternative, the effects of a medium-level projection of coal production are examined; for two alternatives, the no new leasing and the preferred alternatives, the impacts resulting from the high and low coal production projections are also considered. The no new leasing alternative represents the "no-action" alternative and the other six program alternatives are compared to it. In this regard, it must be emphasized that the impacts attributable to the Federal coal management program would be only a small fraction of those resulting from meeting national coal requirements. Finally, except in the discussion of water impacts, impacts attributable to normal economic growth projections are not addressed. Growth which would normally occur in the 12 Federal regions and be considered due to

TABLE 5-13

REGIONAL IMPACT SUMMARY
DENVER-RATON MESA COAL REGION

KEY IMPACT AREAS	ALTERNATIVES						
	NO NEW LEASING	PREFERRED PROGRAM	PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
1985	Base Case[a]	PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	5.0	0.0	0.0	0.0	+20.0	+20.0	+40.0
Coal Consumption (million tons)	20.0	+5.5	+5.5	+5.0	+10.5	+20.0	-0.5
Land Committed (acres)	2,921	+4.3	+4.1	+4.1	+15.3	+24.1	+6.3
Agriculture (thousands 1974 $)	228	+4.4	+3.5	+3.9	+15.4	+24.1	+6.4
Population (thousands)	25.6	+4.7	+4.3	+4.3	+11.7	+19.5	+8.2
Disabling Accidents	391	0	-0.2	+0.2	+2.8	+1.0	+5.1
Water (thousand acre-feet)	67.1	4.9	4.7	4.7	9.8	19.6	-0.6
Game Animal Losses	460	+4.3	+4.3	+4.3	+17.4	+26.1	+4.3
Particulate Emissions (tons)	12,674	+3.4	+3.2	+3.4	+8.8	+15.1	+1.7
Sulfur Oxide Emissions (tons)	12,520	+2	+1.9	+2	+6.3	+8.7	+0.1
1990		PERCENT CHANGE FROM NO NEW LEASING					
Coal Production (million tons)	10.7	-6.5	-1.8	-0.9	-6.5	-29.9	-3.7
Coal Consumption (million tons)	**29.6**	**+ 2.4**	**0**	**+ 0.3**	**+ 5.1**	**+ 5.7**	**- 5.1**
Land Committed (acres)	4,523	+2	-1.8	-1.5	+6.2	+0.5	-5.5
Agriculture (thousands 1974 $)	177	0	-1.7	-1.7	+6.2	+0.6	-5.6
Population (thousands)	38.7	-5.7	-6.5	-7	-15.5	-47.5	-17.3
Disabling Accidents	346	-1.7	-0.9	-0.9	-1.4	-7.5	-2.6
Water (thousand acre-feet)	99.2	0	-2.4	-1.9	2.7	2.8	-7.3
Game Animal Losses	360	0	+2.8	-2.8	+5.6	0	-5.6
Particulate Emissions (tons)	20,683	+0.9	-0.6	-1.0	+1.3	-7.0	-4.3
Sulfur Oxide Emissions (tons)	17,985	+0.6	-1.2	-1.1	+2.6	+3.1	-4.1

(a) Represents absolute values at medium level production.

Shading Key: 10 to 19%; 20 to 29%; 30% and greater

TABLE 5-14

SUMMARY OF PERCENT OF CHANGE BY ALTERNATIVE FROM NO NEW LEASING
MEDIUM PRODUCTION PROJECTION
EASTERN COAL REGIONS
1985

COAL REGION	COAL PRODUCTION	COAL CONSUMPTION	LAND DISTURBANCE	AGRICULTURE	POPULATION	DISABLING ACCIDENTS	WATER	GAME ANIMAL LOSSES	PARTICULATE EMISSIONS	SULFUR OXIDE EMISSIONS
NORTHERN APPALACHIAN										
Preferred	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
PRLAs Only	0.0	-4.9	-2.8	-2.8	-7.3	0.0	-4.4	-2.8	-2.9	-3.8
Emergency	0.0	-4.9	-2.8	-2.8	-7.3	0.0	-4.4	-2.8	-2.9	-3.8
Industry Needs	+0.6	-4.9	-3.0	-3.0	-7.7	-0.6	-4.4	-2.8	-3.0	-3.6
DOE Goals	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
State Determination	+0.2	-4.9	-2.9	-2.9	-7.8	-0.2	-4.4	-2.9	-3.0	-3.7
CENTRAL APPALACHIAN										
Preferred	+0.5	0.0	-0.7	-0.6	-6.6	-0.2	-0.7	-0.7	-0.6	-0.7
PRLAs Only	0.0	0.0	-0.2	-0.3	-1.0	0.0	-0.5	-0.3	-0.3	-0.5
Emergency	+0.3	0.0	-0.5	-0.5	-4.3	-0.2	-0.5	-0.5	-0.4	-0.6
Industry Needs	-6.3	0.0	-4.0	-4.0	-59.3	-4.4	-1.1	-4.0	-2.6	-0.4
DOE Goals	-1.0	0.0	-0.8	-0.8	-10.2	-0.3	-0.4	-0.8	-0.5	-0.3
State Determination	+2.6	0.0	-1.2	-1.2	+24.9	+2.0	-0.4	+1.2	-0.7	-0.6
SOUTHERN APPALACHIAN										
Preferred	-3.2	-2.0	-2.0	-2.0	-4.8	-3.6	-1.9	-2.5	-1.9	-1.8
PRLAs Only	-3.6	-1.6	-1.5	-1.6	-4.1	-3.7	-1.3	-1.6	-1.4	-1.2
Emergency	0.0	-1.6	-1.4	-1.4	-2.3	0.0	-1.6	-1.4	-1.4	-1.5
Industry Needs	+14.9	-1.8	0.0	+2.8	+6.5	+15.0	-1.7	0.0	-0.8	-1.5
DOE Goals	-19.6	-3.2	-5.2	-5.3	-15.8	-19.0	-3.4	-4.7	-4.0	-3.1
State Determination	+16.3	-1.7	-3.2	-3.2	-11.9	-17.1	-1.7	-3.2	-2.2	-1.5
EASTERN INTERIOR										
Preferred	+1.7	-0.2	+0.5	+0.5	+2.0	+1.8	-0.1	+0.5	+0.2	-0.2
PRLAs Only	0.0	-0.3	-0.2	-0.2	-0.4	0.0	-0.3	-0.2	-0.2	-0.3
Emergency	+0.4	-0.3	0.0	0.0	+0.4	+0.5	-0.2	0.0	-0.1	-0.3
Industry Needs	-4.8	+0.3	-0.8	-0.8	-6.5	+4.8	+0.1	-0.8	-0.7	+0.5
DOE Goals	-1.3	-2.5	-2.4	-2.4	-4.3	-1.3	-2.6	-2.5	-2.6	-3.0
State Determination	+3.1	-0.6	+0.4	+0.4	+4.1	+3.2	-0.5	+0.4	+0.1	-0.7
WESTERN INTERIOR										
Preferred	-4.2	-4.0	-4.1	-4.1	-5.9	-4.6	-4.0	-4.3	-3.8	-3.9
PRLAs Only	-3.5	-5.4	-5.3	-5.3	-7.6	-4.1	-5.5	-5.3	-5.0	-5.2
Emergency	0.0	-5.0	-4.7	-4.6	-6.5	-0.5	-5.0	-4.7	-4.6	-4.8
Industry Needs	-42.2	-1.5	-6.0	-6.0	-6.5	-41.7	-1.6	-6.1	-1.6	-1.2
DOE Goals	-23.9	+3.1	0.0	0.0	+0.7	-24.3	+2.9	0.0	+2.5	+2.9
State Determination	+11.2	-5.3	+14.7	+14.7	+21.4	+10.6	-5.3	+14.6	-4.7	-5.1
TEXAS										
Preferred	+3.5	+0.4	+1.1	+1.1	+1.1	+3.4	+0.4	+1.1	+0.6	+0.4
PRLAs Only	+0.4	-0.8	-0.7	-0.7	-0.8	-1.7	-0.8	-0.7	-0.8	-0.8
Emergency	+0.9	-0.4	-0.2	-0.1	-0.2	0.0	-0.4	+0.1	-0.3	-0.8
Industry Needs	-21.5	-1.3	-5.7	-5.7	-5.0	-22.0	-1.5	-5.6	-2.7	-1.4
DOE Goals	-9.8	-0.4	-2.4	-2.4	-2.2	-10.2	-0.5	-2.4	-1.1	+0.2
State Determination	+22.8	+2.2	+6.5	+6.6	+6.5	+22.0	+2.2	+6.5	-3.6	-1.3

TABLE 5-15

SUMMARY OF PERCENT OF CHANGE BY ALTERNATIVE FROM NO NEW LEASING
MEDIUM PRODUCTION PROJECTION
WESTERN COAL REGIONS

1985

COAL REGION	COAL PRODUCTION	COAL CONSUMPTION	LAND DISTURBANCE	AGRICULTURE	POPULATION	DISABLING ACCIDENTS	WATER	GAME ANIMAL LOSSES	PARTICULATE EMISSIONS	SULFUR OXIDE EMISSIONS
SAN JUAN RIVER										
Preferred	+0.8	0.0	+0.3	0.0	+1.6	+2.1	0.0	0.0	+0.3	0.0
PRLAs Only	0.0	0.0	-0.2	0.0	-0.8	0.0	-0.5	0.0	-0.4	-0.5
Emergency	0.0	0.0	-0.2	0.0	-0.8	0.0	-0.5	0.0	-0.4	-0.5
Industry Needs	+20.9	-1.1	+13.2	0.0	+26.6	+16.7	0.8	+20.0	+6.6	-0.1
DOE Goals	-10.8	-13.5	-11.4	0.0	-27.3	-13.5	-13.3	+20.0	-12.3	+12.5
State Determination	+29.0	-1.1	+18.6	0.0	+35.2	+21.9	1.3	+20.0	+9.2	-0.2
UINTA-SOUTHWESTERN UTAH										
Preferred	+1.3	+2.8	+2.8	0.0	+2.4	+0.7	2.7	+3.8	+2.3	+2.6
PRLAs Only	+1.3	+0.6	+0.7	0.0	+1.2	+0.7	0.3	+3.8	+0.6	+0.3
Emergency	+0.3	+1.1	+1.1	0.0	+0.9	+0.2	1.1	+3.8	+0.9	+0.1
Industry Needs	+18.2	+3.9	+6.6	0.0	+19.2	+17.6	4.4	+7.1	+7.9	+3.9
DOE Goals	-10.8	+2.8	+0.6	0.0	-9.0	-11.3	2.2	+3.8	-1.1	+2.7
State Determination	-0.6	+2.8	+2.1	0.0	+0.9	-0.3	2.7	+3.8	+1.8	+2.7
GREEN RIVER-HAMS FORK										
Preferred	+5.2	+2.7	+4.4	+5.2	+7.3	+6.2	2.9	+4.8	+3.8	+2.1
PRLAs Only	+2.5	-1.1	+1.3	+1.7	+2.9	+4.0	-0.6	+2.4	+1.0	-0.7
Emergency	+1.3	0.0	+1.0	+1.7	+1.5	+1.3	0.3	+7.9	+0.8	+0.2
Industry Needs	+47.3	+6.1	+36.1	+36.2	+49.1	+38.1	9.0	+37.0	+26.2	+6.1
DOE Goals	+47.3	+4.4	+35.6	+36.2	+48.0	+38.1	7.6	+36.4	+25.2	+4.1
State Determination	-24.3	+1.1	-17.7	-17.2	-21.6	-16.4	-0.8	-16.4	-11.4	+0.5
POWDER RIVER										
Preferred	0.0	0.0	+0.2	0.0	+0.5	-8.4	0.0	0.0	+0.6	-0.1
PRLAs Only	0.0	0.0	0.0	0.0	+0.1	+0.3	0.0	0.0	+0.0	-0.1
Emergency	0.0	0.0	+0.1	0.0	+0.3	-2.7	0.0	0.0	+0.2	0.0
Industry Needs	+9.8	+2.4	-8.1	+8.7	+11.7	+0.5	4.2	+7.9	+7.8	+3.4
DOE Goals	0.0	-1.8	-0.4	0.0	+0.1	-8.6	-1.4	-0.3	-0.1	-1.0
State Determination	+10.3	-1.8	-7.8	-8.7	-10.4	-21.4	-3.5	-7.9	-6.4	-1.3
DENVER-RATON MESA										
Preferred	0.0	+5.5	+4.3	+4.4	+4.7	0.0	4.9	+4.3	+3.4	+2.0
PRLAs Only	0.0	+5.5	+4.1	+3.5	+4.3	0.0	4.7	+4.3	+3.2	+1.9
Emergency	0.0	+5.0	+4.1	+3.9	+4.3	0.0	4.7	+4.3	+3.4	+2.0
Industry Needs	+20.0	+10.5	+15.3	+15.4	+11.7	+7.1	9.8	+17.4	+8.8	+6.3
DOE Goals	+20.0	+20.0	+24.1	+24.1	+19.5	+7.1	19.6	+26.1	+15.1	+8.7
State Determination	+40.0	-0.5	+6.3	+6.4	+8.2	+33.3	-0.6	+4.3	+1.7	+0.1
FORT UNION										
Preferred	0.0	+11.6	+7.5	+7.5	+12.1	0.0	14.2	+6.7	+10.7	+7.1
PRLAs Only	0.0	+11.6	+7.5	+7.5	+12.5	+50.0	14.2	+6.7	+10.7	+7.1
Emergency	0.0	+11.6	+7.5	+7.5	+12.5	+50.0	14.2	+6.7	+10.7	+7.2
Industry Needs	+15.6	+17.7	+17.9	+17.7	+31.3	+66.7	22.3	+16.8	+21.0	+12.9
DOE Goals	-31.3	+2.5	-11.3	-11.3	-18.3	+16.7	1.8	-11.8	-5.5	+1.4
State Determination	+17.2	+18.2	+18.8	+18.9	-31.3	+68.3	22.7	+18.5	+21.1	+11.6

TABLE 5-16

SUMMARY OF PERCENT OF CHANGE BY ALTERNATIVE FROM NO NEW LEASING
MEDIUM PRODUCTION PROJECTION
EASTERN COAL REGIONS
1990

COAL REGION	COAL PRODUCTION	COAL CONSUMPTION	LAND DISTURBANCE	AGRICULTURE	POPULATION	DISABLING ACCIDENTS	WATER	GAME ANIMAL LOSSES	PARTICULATE EMISSIONS	SULFUR OXIDE EMISSIONS
NORTHERN APPALACHIAN										
Preferred	+0.3	0.0	+0.1	+0.1	+1.8	+0.2	0.0	+0.1	+0.1	+0.1
PRLAs Only	0.0	0.0	0.0	0.0	+12.0	-0.1	0.0	0.0	0.0	0.0
Emergency	0.0	0.0	0.0	0.0	+12.4	0.0	0.0	0.0	0.0	0.0
Industry Needs	-0.7	0.0	-0.2	-0.2	+11.3	-0.7	0.0	-0.2	-0.1	+0.1
DOE Goals	+1.3	0.0	+0.4	+0.4	+6.2	+0.3	0.0	+0.4	+0.3	+0.1
State Determination	+2.6	0.0	+0.6	+0.6	+23.3	+2.2	0.0	+0.6	+0.5	-0.1
CENTRAL APPALACHIAN										
Preferred	-2.3	0.0	-1.0	-0.9	-7.0	-1.6	-0.1	-1.0	-0.6	0.0
PRLAs Only	-0.3	+1.8	+1.0	+1.1	+2.9	-0.2	+1.7	+1.1	+1.1	+1.8
Emergency	-0.5	0.0	-0.2	-0.2	-0.4	-0.4	0.0	+0.2	-0.2	0.0
Industry Needs	-3.8	0.0	-0.4	-0.5	+11.2	-3.0	+0.6	-0.4	-0.6	+0.9
DOE Goals	-2.6	0.0	-1.2	-1.2	-6.5	-1.6	-0.2	-1.2	-0.7	0.0
State Determination	+6.7	-2.7	+1.1	+1.1	-13.7	+4.5	-2.1	+1.5	-0.3	-2.6
SOUTHERN APPALACHIAN										
Preferred	-3.7	0.0	-0.3	-0.3	+13.9	-3.7	0.0	-0.4	-0.1	0.0
PRLAs Only	-0.3	+1.2	+0.9	+0.9	+25.1	-0.2	+0.9	+0.9	+0.1	+0.9
Emergency	0.0	0.0	+0.1	+0.1	+11.6	0.0	0.0	0.0	0.0	0.0
Industry Needs	+15.1	+0.5	+1.6	+1.6	+18.4	+15.2	+0.6	+1.6	+1.2	+0.6
DOE Goals	-45.0	0.0	-3.4	-3.4	-32.6	-45.7	-0.3	-3.4	-1.8	+0.2
State Determination	-46.2	-1.4	-4.7	-4.7	-65.2	-46.4	-1.6	-4.7	-3.2	-1.3
EASTERN INTERIOR										
Preferred	-3.5	+0.6	-1.2	-1.2	-8.4	-3.4	-0.2	-1.3	-0.9	0.0
PRLAs Only	-5.1	+0.8	-1.0	-1.0	-10.3	-4.9	-0.2	-1.1	-1.4	+0.2
Emergency	-1.0	+0.2	-0.8	-0.7	-2.9	-1.0	-0.6	-0.8	-0.6	-0.5
Industry Needs	-14.1	+0.8	-4.4	-1.3	-21.9	-14.0	-0.7	-4.5	-3.6	+0.3
DOE Goals	-5.7	+1.0	-3.0	-3.0	-4.2	-5.5	0.0	-3.0	-0.8	+0.4
State Determination	-14.9	-0.5	+3.9	+3.9	+25.2	+14.8	-0.2	+3.9	+3.2	-1.1
WESTERN INTERIOR										
Preferred	-32.9	+2.9	-2.6	-2.6	-0.3	-33.3	-0.1	-3.2	-0.4	0.0
PRLAs Only	-24.3	+0.5	-3.8	-3.8	-1.9	-24.5	-2.4	-4.7	-2.4	-2.2
Emergency	-5.0	+0.5	-2.4	-2.4	+0.7	-5.3	-2.4	-0.5	-2.2	-2.2
Industry Needs	-60.0	+5.9	-1.7	-1.7	+1.1	-62.0	+2.8	-2.1	+2.0	+2.9
DOE Goals	-60.3	+5.2	-2.8	-2.8	-7.6	-60.3	+2.1	-3.4	+1.4	+2.3
State Determination	+37.3	-2.9	-3.1	-3.0	-0.1	+41.0	-5.7	-4.0	-4.9	-5.5
TEXAS										
Preferred	-27.8	+1.6	-6.0	-6.0	-10.2	-27.5	-0.2	-6.0	-2.1	0.0
PRLAs Only	-2.5	0.0	-1.8	-1.8	-2.9	-2.8	-1.7	-1.8	-1.7	-1.6
Emergency	-3.0	+0.2	-1.7	+0.4	-3.2	-3.7	-1.4	-1.7	-1.5	-1.3
Industry Needs	-50.6	+0.2	-12.1	-12.1	-14.3	-50.5	-1.9	-12.1	-5.0	-1.3
DOE Goals	-33.3	+1.1	-7.6	-7.6	-9.6	-33.0	-0.8	-7.6	-2.9	-0.4
State Determination	-7.0	+0.3	-2.6	-2.6	-11.1	-7.3	-1.4	-2.5	-1.8	-1.3

TABLE 5-17

SUMMARY OF PERCENT OF CHANGE BY ALTERNATIVE FROM NO NEW LEASING
MEDIUM PRODUCTION PROJECTION
WESTERN COAL REGIONS
1990

COAL REGION	COAL PRODUCTION	COAL CONSUMPTION	LAND DISTURBANCE	AGRICULTURE	POPULATION	DISABLING ACCIDENTS	WATER	GAME ANIMAL LOSSES	PARTICULATE EMISSIONS	SULFUR OXIDE EMISSIONS
SAN JUAN RIVER										
Preferred	-15.8	+1.5	-11.2	0.0	-15.8	-13.6	-0.9	-10.0	-5.9	+0.7
PRLAs Only	-7.5	+1.5	-5.2	0.0	-6.1	-6.8	-0.6	0.0	-2.2	0.0
Emergency	-1.6	0.0	-1.4	0.0	-1.6	-1.4	-1.0	0.0	-0.9	-1.1
Industry Needs	+1.0	+0.7	+1.1	0.0	-6.3	+0.9	+0.4	0.0	+2.0	+0.3
DOE Goals	-2.8	-1.5	-3.9	0.0	-11.5	-5.4	-0.7	0.0	-14.4	-1.1
State Determination	+6.0	-1.5	+4.2	0.0	-5.4	+5.4	-1.2	+10.0	+3.5	-2.2
UINTA-SOUTHWESTERN UTAH										
Preferred	-11.1	+5.8	-1.5	0.0	-24.3	-13.1	0.0	-2.8	2.9	+0.5
PRLAs Only	-6.6	-0.5	-5.3	0.0	-21.3	-9.4	-5.8	-68.6	-5.7	-5.1
Emergency	-0.4	+0.5	-3.7	0.0	-7.0	-0.8	-4.8	-5.7	-2.9	-4.5
Industry Needs	+11.1	+6.8	+3.2	0.0	-6.5	+8.5	+1.9	0.0	+3.0	+1.6
DOE Goals	-37.1	+5.8	-9.1	0.0	-72.0	-38.7	-1.8	+2.8	+17.1	+0.6
State Determination	-18.2	+1.5	-28.6	0.0	-35.6	-17.6	-4.5	-5.7	-5.5	-3.6
GREEN RIVER-HAMS FORK										
Preferred	+21.5	+11.0	+16.7	+17.1	+51.3	+17.5	+2.9	+17.3	+12.9	1.2
PRLAs Only	+2.3	+ 1.7	-0.8	0.0	-6.7	+4.6	-7.7	-1.0	-0.9	-5.1
Emergency	+5.5	+ 0.6	+1.9	+2.9	+1.2	+4.6	-8.2	-2.1	+0.5	-5.8
Industry Needs	+51.9	+14.4	+41.6	+40.0	+44.6	+38.7	+9.0	+42.9	+31.3	+4.1
DOE Goals	+51.4	+11.0	+40.4	+40.0	+41.7	+38.0	+6.2	+42.4	+30.3	+2.4
State Determination	-36.3	+ 0.6	-3.2	-2.9	-65.0	-22.1	-12.6	-33.0	-23.5	-6.8
POWDER RIVER										
Preferred	+31.1	+2.6	+23.1	+22.2	+78.3	+13.9	+7.6	+23.3	+24.1	+2.1
PRLAs Only	+16.3	+1.1	+11.6	+11.1	+39.1	+21.2	+3.4	+11.8	+11.8	+0.4
Emergency	+3.6	0.0	+2.1	0.0	+7.6	+1.9	-0.6	+2.8	+2.5	-1.1
Industry Needs	+47.5	+4.1	+35.6	+33.3	+102.4	+28.2	+12.7	+4.3	+36.7	+4.3
DOE Goals	+29.8	+2.6	+22.2	+22.2	+76.3	-12.8	+7.3	+22.5	+23.3	+2.7
State Determination	-11.7	-1.1	-9.3	-11.1	-12.5	-25.6	-5.5	+9.1	-8.5	-3.2
DENVER-RATON MESA										
Preferred	-6.5	+2.4	+0.2	0.0	-5.7	-6.6	0.0	0.0	+0.9	+0.6
PRLAs Only	-1.8	0.0	-1.8	-1.7	-6.5	-1.9	-2.4	+2.8	-0.6	-1.2
Emergency	-0.9	+0.3	-1.5	-1.7	-7.0	-0.9	-1.9	-2.8	-1.0	-1.1
Industry Needs	-6.5	+5.1	+6.2	+6.2	-15.5	-12.2	+2.7	+5.6	+1.3	+2.6
DOE Goals	-29.9	+5.7	+0.5	+0.6	-47.5	-36.8	+2.8	0.0	-7.0	+3.1
State Determination	-3.7	-5.1	-5.5	-5.6	-17.3	-4.7	-7.3	-5.6	-4.3	-4.1
FORT UNION										
Preferred	-17.8	-1.8	-5.8	-5.9	-15.9	-17.5	-0.5	+5.8	-3.0	+0.3
PRLAs Only	-7.0	-0.4	-1.3	-1.1	-8.8	-7.2	+1.5	-1.4	+0.4	+1.0
Emergency	-0.7	+0.2	+1.3	+1.1	-4.7	0.0	+2.5	+1.1	+2.2	+1.5
Industry Needs	+1.7	+4.7	+5.1	+5.2	-6.3	+2.1	+6.7	+4.7	+6.0	+5.3
DOE Goals	-55.8	-12.1	-25.6	-25.7	-33.6	-57.7	-12.6	-25.8	-18.6	-6.8
State Determination	+6.6	+0.9	+4.3	+4.1	-9.5	+7.2	+3.6	+3.9	+4.2	+1.8

non coal-related developments has not been considered in this impact statement.

5.3.1 Coal Production and Consumption

This section presents an overview of the broad interregional shifts in coal production and consumption associated with the Federal coal management program alternatives. Much of the discussion is based on the analysis of the role and need for Federal and western coal presented in Chapter 2 and the description of the impact methodology in Section 5.1.3 of this chapter. This section concludes with a discussion of the implications of the methodological approach employed for this programmatic environmental impact statement.

5.3.1.1 Regional Coal Considerations. The amount of coal produced and consumed in each region is summarized in Tables 5-18 and 5-19, respectively. For comparative purposes the differences in coal production between the no new leasing alternative and each of the other alternatives is shown in Table 5-20. For the preferred program and for the no new leasing alternative, data are presented for the high, medium, and low production estimates. For the other alternatives, only the medium production level is tabulated. For all alternatives the medium level is the only production level regularly addressed in the textual discussion.

The no new leasing alternative is considered as a base case against which the other alternatives are compared, as in Table 5-20, for example. Under this alternative, the supply of Federal coal available for development would be limited to coal already under lease or coal which may be leased under the consent agreement in *NRDC* v. *Hughes.* This could, nevertheless, result in a significant increase in Federal coal production, as already existing leases alone now have a 1985 planned production of 308.6 million tons (see Table 2-20). Adding in other likely production (see Table 2-21), total planned and likely production from existing Federal leases in 1985 is 366 million tons. With the addition of planned production from Indian and other non-Federal lands, total 1985 planned and likely production in the western states comes to 422.2 million tons (see Table 2-29). Essentially none of this production depends on new leasing. In 1985, western coal production under the no new leasing alternative would be 34 percent of total U.S. production (compared to 16 percent in 1976) as shown in Table 5-18. For most alternatives, the differences in western coal production are less than one percent of this base case projection. An exception is the lease to meet industry needs alternative under which western coal is estimated to increase (at the medium level of production) by 20 percent to over 450 million tons.

By 1990, however, the western production projections would show more pronounced changes among the alternatives. For example, western production under the no new leasing alternative would be 38 percent of U.S. production, compared to 43 percent under the preferred program, 49 percent under the lease to meet industry needs alternative, and 34 percent under the state determination of leasing levels alternative. Within the western regions, the greatest fluctuations in absolute terms would be experienced within the Powder River Coal Region. The lease to meet industry needs and lease to meet DOE production goals alternatives project 1990 production from this region at 450 million tons and 396 million tons, respectively. The medium projection under the no new leasing alternative would result in the production of 305 million tons.

Given the Powder River Coal Region's land ownership patterns and the economic desirability of the coal resources, this disparity is to be expected. The coal industry, as any private enterprise, seeks to maximize profits in part by minimizing costs. Producers are attracted to the Powder River Coal Region's fields in Wyoming and Montana with their thick coal seams and relatively low ratio of seam thickness to overburden. The NCM production projections are based on a least cost linear programming model. A program of leasing to meet industry needs would emphasize production of this economically attractive coal. On the other hand, a policy of no new leasing would restrict available production both by preventing expansion of the Federal coal lease reserve base and by affecting the economic viability of private coal dependent upon adjacent Federal reserves for their development. The Powder River Coal Region is highly dependent on Federal leasing to expand production beyond currently planned levels. Between the two alternatives there is a difference in medium level projections for Powder River production of over 20 million tons in 1985 and 145 million tons in 1990.

Changes in western production from one alternative to another would lead to reactive

TABLE 5-18

COAL PRODUCTION SUMMARY
(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1985 PROJECTIONS										
Northern Appalachian	176.0	208.3	211.7	217.5	208.4	211.6	216.7	211.8	211.7	210.4	211.5	211.1
Central Appalachian	206.8	202.7	205.5	178.8	202.7	204.4	175.9	205.6	204.8	192.5	203.4	211.0
Southern Appalachian	23.4	18.0	27.5	42.7	18.0	26.6	40.6	26.5	27.5	31.6	22.1	23.0
Eastern Interior	136.4	209.0	206.1	172.4	209.0	209.7	161.0	206.0	207.1	196.1	203.4	212.6
Western Interior	11.5	12.7	14.2	14.2	12.6	13.6	14.5	13.7	14.2	8.2	10.8	15.8
Texas	14.1	62.4	64.0	48.6	62.5	66.3	35.3	63.7	64.6	50.2	57.7	78.6
Other East	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TOTAL EAST	568.2	713.1	729.0	674.2	713.2	732.2	644.0	727.3	729.9	689.0	708.9	752.1
Powder River	37.4	150.0	204.8	275.0	150.0	205.0	300.0	205.0	205.0	225.0	204.6	183.7
Green River-Hams Fork	25.7	40.0	76.0	99.6	40.0	80.0	130.0	77.9	77.0	112.0	112.0	57.5
Fort Union	11.4	16.9	31.9	51.9	16.9	31.9	51.9	31.9	31.9	36.9	21.9	37.4
San Juan River	8.8	15.0	24.8	39.7	15.0	25.0	40.0	24.8	24.8	30.0	22.1	32.0
Uinta-Southwestern Utah	10.2	15.0	29.6	44.5	15.0	30.0	45.0	30.0	29.7	35.0	26.4	29.4
Denver-Raton Mesa	1.9	2.0	5.0	10.0	2.0	5.0	10.0	5.0	5.0	6.0	6.0	7.0
Other West	10.4	18.3	4.2	6.7	18.3	3.0	6.7	3.8	3.8	6.8	6.6	1.8
TOTAL WEST	105.8	257.2	376.3	527.4	257.2	379.9	583.6	378.4	377.2	451.7	399.6	348.8
TOTAL U.S.	674.0	970.4	1,105.3	1,201.6	970.4	1,112.1	1,227.6	1,105.7	1,107.1	1,140.7	1,108.5	1,100.9

TABLE 5-18 (Concluded)

COAL PRODUCTION SUMMARY

(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLAs ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE COALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1990 PROJECTIONS										
Northern Appalachian	176.0	193.8	219.4	261.5	193.8	220.1	252.8	219.4	219.6	217.8	222.3	225.3
Central Appalachian	206.8	191.3	211.2	237.8	191.2	206.2	217.6	210.5	210.0	203.0	205.5	225.4
Southern Appalachian	23.4	15.6	26.4	42.8	15.6	25.4	40.4	26.3	26.4	30.4	14.5	14.2
Eastern Interior	136.4	275.7	331.5	351.1	274.7	319.7	280.1	314.4	328.0	284.6	312.5	381.1
Western Interior	11.5	13.1	25.5	58.5	12.7	17.1	14.0	19.3	24.2	10.2	10.1	35.0
Texas	14.1	74.0	119.4	154.0	73.0	86.1	100.0	116.4	115.8	58.9	79.6	111.0
Other East	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TOTAL EAST	568.2	763.5	933.4	1105.7	761.0	874.6	904.9	906.3	924.0	804.9	844.5	992.0
Powder River	37.4	175.0	305.0	335.0	175.0	400.0	600.0	355.0	316.0	450.0	396.1	269.1
Green River-Hams Fork	25.7	66.5	98.7	119.0	70.0	120.0	175.0	101.0	104.2	150.0	149.5	62.8
Fort Union	11.4	21.9	51.0	94.9	21.9	41.9	81.9	47.4	50.6	51.9	22.5	54.4
San Juan River	8.8	25.0	59.4	77.3	25.0	50.0	75.0	54.9	58.4	60.0	57.7	63.0
Uinta-Southwestern Utah	10.2	19.8	45.0	65.0	20.0	40.0	60.0	42.0	44.8	50.0	28.3	36.8
Denver-Raton Mesa	1.9	5.0	10.7	15.0	5.0	10.0	15.0	10.5	10.6	10.0	7.5	10.3
Other West	10.4	14.4	10.3	7.7	14.4	10.7	9.1	8.6	10.2	3.7	8.3	14.1
TOTAL WEST	105.8	327.6	580.1	713.9	331.3	672.6	1016.0	619.4	594.8	775.6	669.9	510.5
TOTAL U.S.	674.0	1091.1	1513.5	1819.6	1092.3	1547.2	1920.9	1525.7	1518.8	1580.5	1514.4	1502.5

TABLE 5-19

COAL CONSUMPTION SUMMARY
(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1985 PROJECTIONS										
Northern Appalachian	163.0	180.3	182.9	180.4	180.3	182.9	180.0	173.9	173.9	173.9	182.9	173.9
Central Appalachian	50.7	49.1	56.4	56.8	49.1	56.0	56.0	56.1	56.1	56.0	56.2	56.0
Southern Appalachian	46.6	80.5	106.0	105.3	80.5	103.9	105.9	104.6	104.3	104.0	102.6	104.2
Eastern Interior	107.2	148.4	154.4	165.4	148.4	154.1	166.3	154.0	154.0	154.9	150.6	153.4
Western Interior	37.1	83.1	106.9	109.9	83.1	102.6	117.8	101.1	101.5	105.3	110.2	101.2
Texas	16.5	90.2	137.7	138.8	90.3	138.3	133.0	136.6	137.1	135.9	137.2	140.7
Other East	109.2	141.2	154.7	166.4	141.2	156.1	167.7	155.0	155.4	157.7	155.5	157.0
TOTAL EAST	530.3	772.8	899.0	923.0	772.9	893.9	926.7	881.3	882.3	887.7	895.2	886.4
Powder River	6.2	16.6	16.6	20.2	16.6	16.6	20.5	16.6	16.6	17.0	16.3	16.3
Green River-Hams Fork	8.6	15.4	18.0	18.0	15.4	18.5	18.4	17.8	18.0	19.1	18.8	18.2
Fort Union	11.6	19.9	19.8	35.4	22.1	22.1	35.8	22.1	22.1	23.3	20.3	23.4
San Juan River	8.5	8.6	8.9	14.1	8.6	8.9	14.1	8.9	8.9	8.8	7.7	8.8
Uinta-Southwestern Utah	4.9	16.8	17.8	20.7	16.8	18.3	21.1	17.9	18.0	18.5	18.3	18.3
Denver-Raton Mesa	5.2	16.5	20.0	22.7	16.5	21.1	23.2	21.1	21.0	22.1	24.0	19.9
Other West	19.7	28.3	33.2	44.9	28.4	33.3	45.5	33.1	33.1	33.6	33.4	33.2
TOTAL WEST	64.7	122.1	134.3	175.9	124.4	138.8	178.6	137.4	137.7	142.4	138.8	138.1
TOTAL U.S.	595.0	894.9	1,033.3	1,098.9	897.3	1,032.7	1,105.3	1,018.7	1,020.0	1,030.1	1,034.0	1,024.5

TABLE 5-19 (Concluded)

COAL CONSUMPTION SUMMARY
(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1990 PROJECTIONS										
Northern Appalachian	163.0	178.9	210.1	210.1	183.6	210.3	312.9	210.1	210.1	210.1	210.1	210.1
Central Appalachian	50.7	65.6	84.7	85.3	65.6	84.7	100.3	86.3	84.8	85.4	84.6	82.4
Southern Appalachian	46.6	80.3	118.0	118.5	80.3	118.0	156.7	119.2	118.1	118.6	118.0	116.4
Eastern Interior	107.2	164.7	174.4	173.4	164.9	174.4	214.8	174.7	173.5	174.7	175.0	172.5
Western Interior	37.1	90.7	175.1	173.6	90.9	175.1	201.2	171.1	171.1	180.2	179.1	165.2
Texas	16.5	116.0	251.3	228.2	115.7	251.3	271.1	247.2	247.9	247.7	250.0	248.0
Other East	109.2	155.8	206.7	204.9	155.8	206.7	287.5	203.3	203.7	209.1	204.5	204.9
TOTAL EAST	530.3	852.0	1,220.3	1,194.0	856.8	1,220.5	1,544.5	1,211.9	1,209.2	1,225.8	1,221.3	1,199.5
Powder River	6.2	23.3	27.6	27.1	23.4	27.6	27.6	27.2	26.9	28.0	27.6	26.6
Green River-Hams Fork	8.6	18.1	20.1	18.3	18.2	20.1	19.1	18.4	18.2	20.7	20.1	18.2
Fort Union	11.6	30.1	44.0	48.7	30.1	44.0	47.4	44.6	44.9	46.9	39.4	45.2
San Juan River	8.5	10.5	13.6	13.3	10.7	13.6	24.6	13.6	13.4	13.5	13.6	13.2
Uinta-Southwestern Utah	4.9	21.7	21.8	21.7	22.3	21.8	29.1	20.5	20.7	22.0	21.8	20.9
Denver-Raton Mesa	5.2	23.4	30.3	30.6	23.4	30.3	35.3	29.6	29.7	31.1	31.3	28.1
Other West	19.7	38.9	70.6	66.3	39.2	70.6	91.7	66.3	66.3	71.1	70.8	67.1
TOTAL WEST	64.7	166.0	228.0	226.0	167.3	228.0	274.8	220.2	220.1	233.3	224.6	219.3
TOTAL U.S.	595.0	1,018.0	1,448.3	1,420.0	1,024.1	1,448.5	1,818.3	1,432.1	1,429.4	1,459.1	1,445.9	1,418.8

TABLE 5-20

FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES
COMPARISON OF 1985 AND 1990 REGIONAL COAL PRODUCTION LEVELS

(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1985 PROJECTIONS										
Northern Appalachian	176.0	208.3	211.7	217.5	0.1	-0.1	-0.8	0.1	-	-1.3	-0.2	-0.6
Central Appalachian	206.8	202.7	205.5	178.8	-	-1.1	-2.9	0.1	-0.7	-13.0	-2.1	5.5
Southern Appalachian	23.4	18.0	27.5	42.7	-	-0.9	-2.1	-1.0	-	4.1	-5.4	-4.5
Eastern Interior	136.4	209.0	206.1	172.4	-	3.6	-11.4	-0.1	1.0	-10.0	-2.7	6.5
Western Interior	11.5	12.7	14.2	14.2	-0.1	-0.6	0.3	-0.5	-	-6.0	-3.4	1.6
Texas	14.1	62.4	64.0	48.6	0.1	2.3	-13.3	-0.3	0.6	-13.8	-6.3	14.6
Other East	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL EAST	568.2	713.1	729.0	674.2	0.1	3.2	-30.2	-1.7	-	-40.0	-20.1	23.1
Powder River	37.4	150.0	204.8	275.0	-	0.2	25.0	0.2	0.2	20.2	-0.2	-21.1
Green River-Hams Fork	25.7	40.0	76.0	99.6	-	4.0	30.4	1.9	1.0	36.0	36.0	-18.5
Fort Union	11.4	16.9	31.9	51.9	-	-	-	-	-	5.0	-10.0	5.5
San Juan River	8.8	15.0	24.8	39.7	-	0.2	0.3	-	-	5.2	-2.7	7.2
Uinta-Southwestern Utah	10.2	15.0	29.6	44.5	-	0.4	0.5	0.4	0.1	5.4	-3.2	-0.2
Denver-Raton Mesa	1.9	2.0	5.0	10.0	-	-	-	-	-	1.0	1.0	2.0
Other West	10.4	18.3	4.2	6.7	-	-1.2	-	-0.4	-0.4	2.6	2.4	-2.4
TOTAL WEST	105.8	257.2	376.3	527.4	-	3.6	56.2	2.1	0.9	75.4	23.3	-27.5
TOTAL U.S.	674.0	970.3	1105.3	1201.6	0.1	6.8	26.0	.4	1.8	35.4	3.2	- 4.4

TABLE 5-20 (concluded)

FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES
COMPARISON OF 1985 AND 1990 REGIONAL COAL PRODUCTION LEVELS

(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1990 PROJECTIONS										
Northern Appalachian	176.0	193.8	219.4	212.6	-	0.7	40.2	-	0.2	- 1.6	2.9	5.9
Central Appalachian	206.8	191.3	211.2	196.6	-0.1	-5.0	21.0	-0.7	-1.2	- 8.2	- 5.7	14.2
Southern Appalachian	23.4	15.6	26.4	42.3	-	-1.0	- 1.9	-0.1	-	4.0	-11.9	-12.2
Eastern Interior	136.4	275.7	331.5	290.4	-1.0	-11.8	-10.3	-17.1	-3.5	-46.9	-19.0	49.6
Western Interior	11.5	13.1	25.5	26.6	-0.4	- 8.4	-12.6	- 6.2	-1.3	-15.3	-15.4	9.5
Texas	14.1	74.0	119.4	98.9	-1.0	-33.3	1.1	- 3.0	-3.6	-60.5	-39.8	- 8.4
Other East	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL EAST	568.2	763.5	933.4	867.4	-2.5	-58.8	37.5	-27.1	-9.4	-128.5	-88.9	58.6
Powder River	37.4	175.0	305.0	337.0	-	95.0	263.0	50.0	11.0	145.0	91.1	-35.9
Green River-Hams Fork	25.7	66.5	98.7	119.0	3.5	21.3	56.0	2.3	5.5	51.3	50.8	-35.9
Fort Union	11.4	21.9	51.0	94.9	-	-9.1	-13.0	-3.6	-0.4	0.9	-28.5	3.4
San Juan River	8.8	25.0	59.4	77.3	-	-9.4	- 2.3	-4.5	-1.0	0.6	- 1.7	3.6
Uinta-Southwestern Utah	10.2	19.8	45.0	65.0	0.2	-5.0	- 5.0	-3.0	-0.2	5.0	-16.7	-8.2
Denver-Raton Mesa	1.9	5.0	10.7	15.0	-	-0.7	-	-0.2	-0.1	-0.7	-3.2	-0.4
Other West	10.4	14.4	10.3	0.4	-	0.4	8.7	-1.7	-0.1	-6.6	-2.0	3.8
TOTAL WEST	105.8	327.6	580.1	708.6	3.7	92.5	307.4	-39.3	14.7	195.5	89.8	-69.6
TOTAL U.S.	674.0	1091.1	1513.5	1576.0	1.2	33.7	344.9	12.2	5.3	67.0	.9	-11.0

TABLE 5-21

LAND REQUIREMENTS: COMPARISON OF ALTERNATIVES
(acres)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	26,367	25,870	26,711	4	- 5	- 63	-721	-724	- 769	- 10	- 746
Central Appalachian	14,715	15,796	14,754	0	-108	-239	- 39	- 74	- 624	- 131	- 187
Southern Appalachian	11,160	15,301	15,970	0	-311	- 55	-236	-211	- 3	- 800	- 486
Eastern Interior	26,055	26,295	25,835	0	135	-250	- 53	- 1	- 206	- 640	107
Western Interior	13,282	16,386	16,816	-6	-671	1,107	-865	-748	- 982	7	2,410
Texas	17,108	23,707	22,649	21	260	-1,851	-174	- 36	-1,343	- 570	1,550
Powder River	6,783	8,426	10,947	0	20	814	5	11	- 685	- 32	- 656
Green River-Hams Fork	4,992	8,210	10,106	0	362	2,433	107	78	2,964	2,926	-1,455
Fort Union	3,506	4,190	7,490	298	315	52	316	316	751	- 475	787
San Juan River	2,273	3,100	4,884	0	9	17	- 7	- 7	408	- 352	576
Uinta-Southwestern Utah	2,550	2,793	3,249	0	77	61	20	30	184	16	60
Denver-Raton Mesa	2,196	2,921	3,577	0	127	63	121	121	446	704	183
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	24,448	28,125	40,800	357	36	581	- 7	- 1	- 56	113	169
Central Appalachian	15,511	18,662	21,148	- 4	-187	- 164	190	- 37	- 74	- 230	216
Southern Appalachian	10,713	16,311	20,912	0	- 47	1,227	147	11	261	- 560	- 767
Eastern Interior	26,253	28,393	31,554	2	-354	5	-291	-213	-1,259	- 861	1,100
Western Interior	13,395	25,876	30,886	- 5	-661	2,320	-991	-631	- 433	- 713	- 797
Texas	21,519	43,684	48,676	-120	-2,640	3,993	-791	-751	-5,282	-3,320	-1,123
Powder River	8,455	12,535	13,232	17	2,898	8,535	1,454	260	4,457	2,780	-1,168
Green River-Hams Fork	7,433	9,822	11,197	266	1,645	4,734	- 74	190	4,087	3,972	- 310
Fort Union	5,115	8,517	11,287	0	- 496	683	-108	110	434	-2,181	363
San Juan River	3,441	6,430	9,492	38	- 723	155	-335	- 88	70	- 249	269
Uinta-Southwestern Utah	3,412	3,439	4,487	96	- 50	161	-182	-128	110	- 312	- 985
Denver-Raton Mesa	3,431	4,523	5,215	11	8	495	- 81	- 68	281	21	- 249

(a) Land required for facilities and coal production (mining) in 1985 and 1990 under the No New Leasing Alternative. Remaining columns represent differences from the No New Leasing Levels.

changes in eastern and midwestern coal production. This result follows from the assumption that total regional energy demands (on a Btu basis) remain invariant under the program alternatives analyzed (for given low, medium, or high demand assumptions). Thus, when the supply of western coal is assumed to decline under a given leasing alternative (for example, state determination of leasing levels), greater output from other coal fields is projected to take up the excess. The adjustments resulting from different western production levels create the greatest supply fluctuations in regions that are geographically close to the western coal supply areas, namely the Texas, Eastern Interior, and Western Interior Coal Regions. For example, should the supply of coal in the Powder River Coal Region projected to flow to the Texas Coal Region markets be restricted under the no new leasing alternative, the energy shortfall would not be expected to be made up with coal supplied from the East, but from elsewhere in the West and Midwest.

5.3.1.2 Implications of Methodological Approach. As discussed in Section 5.1, in defining production levels and flow distributions for the Federal coal management program alternatives, it was assumed that Btu demand in each of the 53 geographical consumption areas analyzed would be specified at a constant level for each of the production levels in 1985 and 1990. For example, the Btu demand in the Northern Appalachian Coal Region at the medium production level would be constant for all mid-level production program alternatives analyzed. The specified area demand levels (in terms of total Btus of energy) correspond to the lease to meet DOE production goals levels as derived from the NCM output. Because the Btu content of coal from various sources differs, the projected tonnage will also vary under these alternatives where differing amounts of coal from each region are projected. The Btu consumption, however, is assumed to remain constant for each level (i.e., high, medium and low).

The primary advantage of this assumption is that it enables a rapid redistribution of coal flows in response to projected changes in the level of future western coal production. Other approaches were not available to generate comparable data essential to the timely completion of this environmental impact statement. Major implications of the constant demand and related methodological assumptions are discussed below.

The first implication relates to the general acceptability of the NCM high, medium, and low coal demand estimates. The NCM projects a 1985 medium level demand of 1.1 billion tons, a 64 percent increase over the 1976 production of 674 million tons. Many believe growth of this magnitude is overly optimistic, particularly in view of the myriad of uncertainties involved in estimating coal demand at such high levels over the relatively short time between 1979 and 1985. A new iteration of the NCM, may, with updated assumptions such as competing fuel costs, transportation rates, and environmental control standards, produce total United States coal demand projections which would be more generally accepted by governmental and industry spokesmen. Nevertheless, for the purposes of this environmental impact statement, the projections derived from NCM output effectively bracket the range of regional coal demand in 1985 and in 1990.

The methodology also assumes that the proportional split between underground and surface mining would remain constant for a given production level for a given year for all alternatives analyzed. The proportional split does, however, vary between production levels (high, medium, and low) and between years (1985 and 1990). It is likely that the relative economics of extraction could shift slightly to favor one extractive method over another for incremental changes in production in a given year between the program alternatives. However, any inaccuracies resulting from this approach appear to be minor. Also, the coal regions experiencing the greatest production variations among the alternatives (i.e., Power River and Texas) are not projected to produce any underground mined coal.

Another assumption in the projections derived from the NCM output is related to the use of coal. These projections assume a constant proportional allocation of coal in a region among various coal conversion and utilization technologies for a given national coal production level (low, medium, or high). For example, the proportional split among coal-using sectors (i.e, steam electric generation, coke production, synthetic fuels) does not vary between alternatives at any specified production level. The proportional split does, however, vary between production levels (low to medium, medi-

um to high, etc.) and between years (1985 versus 1990).

A final consideration concerns the constant regional demand assumption. The economics of coal use are such that a change of only a few cents per million Btus of energy could influence both the consumptive demand for coal and the relative economic desirability of developing regional coal reserves. To a considerable extent, this fact is considered in the projections by the NCM, which reports the interrelationship between the price of coal and the quantity demanded at each production level. A more sophisticated methodology would have been possible, taking into account the interaction between various substitutes for coal (e.g., oil and gas, nuclear generation of electricity, etc.) such that a change in the relative prices of these alternative energy sources would result in a shift in demand. Such a methodology might have yielded more precise estimates of the amount of coal demanded, but it is questionable whether it would be more useful. For one thing (as discussed in Section 2.5), coal substitutes such as oil and gas are of limited availability in the long term. Also, the NCM uses a least cost linear programming approach. To assume restricted availability of the most economically recoverable coal reserves (private or Federal) would invariably lead to higher fuel costs, with potentially serious national economic growth implications.

5.3.2 Physical Impacts

This section analyzes the environmental impacts of the Federal coal management program alternatives on selected physical resources. Topography, geology, minerals, and soils impacts are treated rather broadly on a regional basis; the specific effects are highly dependent on the physical setting of individual mines and other coal-related activities. Land disturbance, water quality, and air quality also depend to a considerable degree on conditions at each specific site. However, to the extent feasible, these are discussed quantitatively in more detail. These factors, however, are highly significant in any comprehensive consideration of physical impacts of the Federal coal management program alternative.

5.3.2.1 Land Disturbance and Reclamation. This section addresses the amounts of land in each coal region that would be temporarily and permanently disturbed during the periods from 1976 to 1985 and from 1986 to 1990 for each production level of each alternative. Land requirements for mining, coal beneficiation, conversion, and utilization plants and development to support coal related population increases are considered.

Land area that would be required for coal development activities in the specific years 1985 and 1990 (exclusive of land to support coal related population increases) under the no new leasing alternative is listed by coal regions and coal projections in Table 5-21. Land required to implement the other six alternatives is tabulated according to its variation from the no new leasing values. For example, under the preferred program at the medium level of production, 311 fewer acres would be required in the Southern Appalachian Coal Region than under no new leasing program alternative, whereas in the Eastern Interior Coal Region, 135 more acres would be required. Acres tabluated represent land required for coal operations during the relevant time period, without regard to how much could be reclaimed. In terms of total land required at these discrete periods in time, midwestern coal regions (Eastern and Western Interior and Texas) would be impacted substantially more than the eastern or western regions regardless of the Federal coal management program alternative implemented. Maximum differences among alternatives at the medium production level would occur under the leasing to meet industry needs and leasing to meet DOE goals alternatives; the land requirement for 1985 in the Green River-Hams Fork Coal Region is about 35 percent greater under these than for the base case of no new leasing. In 1990, increases in land requirements under these alternatives and under the lease PRLAs only alternative may also be deemed significant for the Powder River Coal Region. Decreased land requirements under leasing to meet industry needs and leasing to meet DOE goals alternatives in both 1985 and 1990 would be experienced in the Texas Coal Region. Significant increases in the Western Interior and Texas Coal Regions would occur in 1985 under the state determination of leasing levels alternative whereas in 1990 this alternative would slightly decrease land requirements in these regions. Changes in other regions, and particularly in the East under all alternatives, reflect only small percentages of the base case values.

The accumulative amounts of land that would be required under the preferred program (medium level of production) for each region between 1976 and 1990 are listed in Table 5-22. Land requirements for coal production (mining), facilities (coal cleaning, conversion, and consumption, and mine site facilities) and coal-related population increases are considered. Total land required (column 4) represents the sum of land requirements by 1990 without regard for reclamation, and includes both long-term and short-term commitments. Figures enclosed in parentheses show in each column the percent of the total land represented by each category of usage.

It can be seen that greatest land requirements under the preferred program would occur in the Eastern Interior Coal Region (approximately 170,000 acres). The Northern Appalachian (150,000 acres) and Texas (138,000 acres) Coal Regions would rank second and third respectively. The largest percentage of land required for non-mining purposes, 82 percent, occurs in the Uinta-Southwestern Utah Coal Region, followed by the Denver-Raton Mesa (75 percent), Western Interior (68 percent), and Texas (60 percent) Coal Regions. In terms of total acreage, the greatest land area for coal-related facilities is required in the Texas Coal Region (36,000 acres).

Land requirements for coal production under the preferred program would be greatest in the Central Appalachian (79,000 acres) and Northern Appalachian (71,000 acres) Coal Regions between 1976 and 1985. Between 1986 and 1990 the land required for mining would be greatest in the Green River-Hams Fork and Powder River (both approximately 33,000 acres) Coal Regions.

Estimates of the amount of land that would remain actively disturbed (including land subject to a major change of land use) as of 1990 under the preferred program at the medium level of production are shown in Table 5-23. The estimates have been derived in the following way. It was assumed that on the average 40 percent of the land actually required for coal-related purposes would be preempted from any other use. For example, much of the land purchased for a power plant may be left in its wooded state. Similarly, transmission lines frequently occupy land devoted to other purposes. Thus, the figures in the first column of Table 5-23 represent 40 percent of the corresponding values in Table 5-22. The second column lists acreage estimated to be disturbed due to coal-related population increases. It was assumed that all land required to support this increase in population would remain in intensive useage throughout the life of the project, and would not be subject to reclamation in the same sense as land actively mined. The third column lists acreage disturbed due to active mining. These figures represent twice the estimated annual production rate assumed for 1990, based on the assumption of a two-year lag between mining and reclamation; thus, land which had been mined three or more years before 1990 would be in the process of being reclaimed. The fourth column sums these figures to give estimates of land disturbance *in* 1990. Column 5 estimates long term (beyond 1990) disturbance based on the assumption that all land actually mined between 1976-1990 will be reclaimed and could put in a different land use while the component of land comitted to facilities or coal-related population increase would likely remain the the same use. The Texas (73,000 acres), Eastern Interior (68,000 acres) and Powder River (54,000 acres) Coal Regions would have the largest amounts of land disturbed by 1990, and, on a long-term basis (beyond 1990). Comparatively speaking, and considering only total numbers, more land would be disturbed by 1990 and over the long term in the Eastern and Interior Coal Regions than in the West. These relative impacts would not be significantly changed under any of the other alternatives, as tabulated in Table 5-21, although the amount of land under long-term commitment would increase for the Powder River and Green River-Hams Fork Coal Regions under those alternatives (such as leasing to meet industry needs and leasing to meet DOE production goals) in which total land usage increases over the no new leasing base case.

Reclamation Potential. The basic purposes of SMCRA that pertain to reclamation are to assure that surface mining operations are not allowed if the required reclamation is not feasible, to assure that reclamation be as contemporaneous with mining as possible, and to promote reclamation of abandoned mine areas. The unsuitability criteria (Section 522 of SMCRA) relate to reclamation in a general way in that mining would not be allowed if it caused a substantial long-range production loss of renewable resource lands and such a loss would occur if it were not possible to reclaim the mined

TABLE 5-22

ACRES OF LAND REQUIRED BY COAL REGION FOR THE PREFERRED PROGRAM

MEDIUM COAL PRODUCTION PROJECTION BETWEEN 1976 AND 1990

REGION	LAND REQUIRED FOR COAL PRODUCTION (a)			LAND REQUIRED FOR COAL-RELATED FACILITIES (b)	LAND REQUIRED FOR COAL-RELATED POPULATION INCREASES (c)	TOTAL LAND REQUIRED
	1976-1985	1986-1990	Total (1976-1990)			
Northern Appalachian	70,605	26,405	97,010 (65%)(d)	25,296 (17%)	27,480 (18%)	149,786
Central Appalachian	78,660	29,425	108,085 (79%)	14,865 (11%)	14,300 (10%)	137,250
Southern Appalachian	15,680	6,653	22,333 (41%)	15,621 (29%)	16,760 (30%)	54,714
Eastern Interior	70,009	27,863	97,872 (58%)	24,014 (14%)	48,280 (28%)	170,166
Western Interior	18,445	7,063	25,528 (32%)	24,202 (30%)	29,980 (38%)	79,710
Texas	28,525	27,050	55,575 (40%)	35,541 (26%)	46,600 (34%)	137,716
Powder River	26,650	33,275	59,925 (59%)	9,185 (9%)	32,480 (32%)	101,590
Green River-Hams Fork	35,870	33,365	69,235 (82%)	4,954 (6%)	9,740 (12%)	83,929
Fort Union	10,395	8,855	19,250 (54%)	6,211 (17%)	10,120 (28%)	35,581
San Juan River	11,515	12,765	24,280 (69%)	3,342 (10%)	7,460 (21%)	35,082
Uinta-Southwestern Utah	1,255	1,350	2,605 (18%)	3,164 (22%)	8,640 (60%)	14,409
Denver-Raton Mesa	1,845	1,963	3,808 (25%)	4,157 (27%)	7,300 (48%)	15,265
Totals			585,506 (58%)	170,552 (17%)	259,140 (25%)	1,015,198

(a) Acres required to meet projected coal production estimates exclusive of reclamation.

(b) Includes estimates of land required for coal cleaning, conversion and consumption facilities and land required for mine-site facilities.

(c) Based on a requirement of 200 acres per 1000 people. Population projections from Table 5-48. Higher population projection (1985 or 1990) used under the assumption that if population due to coal development decreased from 1985 to 1990, land supporting coal related population would continue to support people regardless of occupation.

(d) Percent of the total land required by region for each of the categories.

TABLE 5-23

ESTIMATES OF LAND DISTURBED BY MINING ACTIVITIES, COAL CLEANING AND CONSUMPTION, AND COAL-RELATED POPULATION INCREASES IN 1990 UNDER THE PREFERRED ALTERNATIVE, MEDIUM COAL PRODUCTION PROJECTIONS

(acres)

REGION	COAL-RELATED FACILITIES(a) (AS OF 1990)	COAL-RELATED POPULATION INCREASES (b)	ACTIVE MINING PLUS LAND BEING RESHAPED (c)	TOTAL LAND DISTURBANCE IN 1990 (d)	LONG TERM DISTURBANCE (BEYOND 1990) (e)
Northern Appalachian	10,118	27,480	8,820	46,418	37,598
Central Appalachian	5,946	14,300	10,614	30,860	20,246
Southern Appalachian	6,248	16,760	2,440	25,448	23,008
Eastern Interior	9.606	48,280	9,700	67,586	57,886
Western Interior	9,681	29,980	2,470	42,131	39,661
Texas	14,216	46,600	12,226	73,042	60,816
Powder River	3,674	32,480	17,600	53,754	36,154
Green River-Hams Fork	1,982	9,740	15,882	27,604	8,722
Fort Union	2,484	10,120	4,022	16,626	12,604
San Juan River	1,337	7,460	6,856	15,653	8,797
Uinta-Southwestern Utah	1,266	8,640	578	10,484	9.906
Denver-Raton Mesa	1,663	7,300	948	9,911	8,963
Total	68,221	259,140	92,156	419,517	327,361

(a) Assumes 40% of the total land required for coal cleaning conversion and consumption facilities and mine site facilities (Table 5-6) is put into buildings or other hard surface areas and would not be reclaimable during the life of the project.

(b) Assumes all land required to support coal related population increases remains man-influenced for the life of the project (From Table 5-6).

(c) 1990 mining rate time two. Assumes a two year lag between mining and when land is ready for seeding/revegetation.

(d) Land disturbance includes land actively being disturbed (e.g. mining) and land committed to a major land use change (e.g. building, pavement).

(e) Assumes all mined land is reclaimed without regard to success of reclamation effort or future land use.

land. The primary reclamation requirements are contained in the environmental protection performance standards (Section 515 of SMCRA) which require that mined land be restored to equal or better uses compared to its premining condition.

All of the surface coal operations associated with each of the program alternatives being considered in this environmental impact statement, including the no new leasing alternative, would be covered by the reclamation requirements of SMCRA. The only variations in reclamation requirements among the different program alternatives would be the number of acres requiring reclamation and the differences in degree of intensity of reclamation efforts as they relate to the various types of land being disturbed.

This section addresses the reclamation potential and problems likely to be encountered in the coal producing regions. Since specific sites to be mined or reclaimed are not known at this level of analysis, the discussion is necessarily generic in nature. Actual reclamation potential is highly dependent on detailed information specific to the sites to be reclaimed. Since each of the alternatives project some coal development in all of the coal regions, all of the alternatives could affect lands with varying potentials for reclamation. Therefore, variation among alternatives at this non-site specific level of analysis will be in the differing amounts of land that will require reclamation as a result of coal development.

Reclamation potential is dependent upon climate, inherent chemical and physical properties of the spoils, and to a lesser extent, upon the biological character of the area. Among the factors that would affect reclamation success are type, toxicity, depth, and fertility of the spoils, amounts and frequency of precipitation, erosion potential, slope and aspect of the land, choice of plants used in revegetation, timing of seeding or planting, and proposed use of the reclaimed area.

Water availability would have a direct influence on revegetation potential in all of the coal regions. Generally speaking, water availability is not a major problem in the eastern (Appalachian) or midwestern (Eastern and Western Interior and Texas) coal regions. In the western coal regions, however, rainfall patterns are extremely variable and in some areas, consistently low. Arid and semiarid lands, particularily in the southwest (e.g. San Juan River Coal Region), have areas with average rainfalls of eight inches or less a year. While the amounts of water needed to sustain revegetation will vary with species requirements, areas receiving less than 10 inches of annual precipitation will likely require supplemental water. The question of whether initially irrigated plant communities can achieve and maintain densities similiar to undisturbed native areas on reclaimed land has not been answered. Additionally, plant communities established under irrigation systems may be severely impacted if a drought year occurs after irrigation is terminated [14, 15]. Revegetation success may also vary according to techniques used for irrigation. Dense stands of vegetation established under sprinkler irrigation may not establish dense root systems. Drip irrigation, on the other hand, may encourage a more concentrated root system around the water source, but may not encourage the development of dense stands [105]. Water harvesting methods[5] may prove successful for arid and semiarid land reclamation [104,105]. However, when ditching is used for water harvesting, periods of exceptionally heavy runoff may create enough siltation to destroy established vegetation [105]. Water rights and legal claims to water may also limit the amount of water available for mined land irrigation, particularly in the San Juan River Coal Region [105].

Soil conditioning and amendment may be required in any of the regions. Included among the most common conditioning techniques are topsoiling, fertilizer addition, spreading chemical additives for soil neutralization, and mulching. Topsoil addition may be required to overcome specific problems or to provide a proper medium for plant growth. In areas naturally subject to leaching, underlying soils may contain more nutrients than native topsoil. Segregation and replacement of native topsoils in these cases could produce less favorable results than mixing spoils. The amounts of topsoil required to overcome saline or sodic soils in western coal regions, or acid conditions in eastern and mid-western coal regions, are variable. Barth [102] indicates that while the depth or topsoil

[5]An example of water harvesting is a method under investigation in Washington state which involves smoothing tops and sides of spoil banks and seeding "valleys" between banks. Experiments are being conducted to provide more effective waterproofing of spoil slopes to allow more of the runoff water to reach the planted area.

required for successful revegetation has yet to be precisely determined, as much as one foot may be required over saline or sodic spoils in the western regions. Sandoval et al. [98] found that as little as two inches of topsoil placed over sodic soils in portions of the Northern Great Plains increased the water infiltration rate several fold, reduced runoff, and vastly improved plant survival and growth. It is preferred, however, to apply a greater thickness of topsoil [96]. A topsoil layer of up to two feet or more may be required in extremely acid sites in the Appalachian Coal Region [97]. Unless handled properly, toxic spoils would severely limit or totally negate any revegetation effort.

A number of plant species have been tested and appear to be useful for revegetation on spoils of varying quality [99, 100, 101, 103]. Care must be taken that proper species (and in many cases proper strain of the species) be selected for revegetation that will best serve the intended land use objective. Reseeding efforts, however, will likely produce areas with different species and densities from surrounding natural areas. Reclamation efforts in the southwest currently emphasize late successional species which are difficult to establish under low water availability [105]. Plantings with earlier sucessional stages may prove a benefit to long term success. Plantings with introduced species may be established quicker and be more productive, but they also require more skillful management to achieve and maintain this production [96]. Long term stability of revegetated areas is not known.

Success of revegetation is also highly dependent on timing and method of planting. Generally speaking, arid and semiarid regions of the southwest may show greatest results from plantings in late summer since this is just prior to normal periods of greatest precipitation. Similarly, fall plantings in intermountain areas of the West and spring plantings in the Plains areas and in the interior and eastern coal regions should give more favorable results.

Land use planning and objectives will play a major role in determining the success of reclamation. Forage, pasture, and agricultural crops may grow well on mine spoils, but would be less practical in regions where agriculture contributed little to the economy [97]. Packer [4] lists several rehabitation options available for the Northern Great Plains which would also be applicable to other regions. These are:

- Return as nearly as possible to original range/forest condition.
- Return to previous agricultural cropland condition.
- Convert from previous range/forest condition to agricultural cropland.
- Convert from previous agricultural cropland to range/forest condition.
- Take advantage of such specialized features as water for ponds or lakes to develop unique recreation and/or wildlife habitat areas.
- Develop such intensified land uses as airports, industrial or residential areas, solar energy sites, etc.

In western coal regions, postmining land use would likely be limited to grazing as the dominant land use. Because of difficulties associated with overcoming precipitation deficits, this dominant land use should not change.

In the midwestern regions, extensive mining and postmining reclamation would probably decrease forest land acreage while increasing the amount of grazing land. For example, presently approved reclamation plans in Illinois may cause a 20 percent increase in pastureland and a 19 percent decrease in forest land in affected areas. Carter et al [11] and Kennedy et al [12] attribute the increase in pastureland to its much lower cost of reclamation. Cropland would remain about the same [5]. Surface coal mining in midwestern areas has encroached on valuable prime agricultural lands. In 1976, for example, three-year permits were issued to surface mine 17,230 acres within the State of Illinois. Of this total acreage, 12,954 acres, or about 75 percent, is classified as prime agricultural land by the U.S. Soil Conservation Service [5]. An increase in surface mining activity would undoubtedly advance the disturbance of prime agricultural lands and affect both the economies and environments in midwestern surface mining areas. A major concern of mining prime agricultural lands is whether or not the technology or knowledge exists which would allow the successful reestablishment of those soil factors which are conducive to successful crop production.

In the Texas Coal Region, reclamation to the current dominant land use of grazing probably would not change appreciably. In the Appalachian

Coal Regions, a reduction of forest land (the dominant land use) is anticipated. Due to the close proximity of numerous densely populated cities to coal areas in the Appalachian Regions, an opportunity would be provided for increased land values and stimulation of local economies by establishing recreational facilities and second home communities. Coal companies have recently given more emphasis to reclaiming surface-mined land to recreational and housing developments [13]. However, these have been isolated endeavors, primarily because marketability has not been thoroughly investigated.

Packer [4] developed a method for predicting the rehabilitation potential success on large tracts of land in the Northern Great Plains. This method expresses rehabilitation potential using a scale from -9 to +9, with the latter representing areas where success is expected to be greatest. The scale considers: (1) the productivity and stability characteristics of surface soil materials; (2) the suitability and availability of native plant species for plant cover re-establishment and their availability; and (3) the amount and distribution of rainfall. The predictive capacity of Packer's method is not expected to be useful on a site specific basis, but is useful in predicting potential rehabilitation success on larger tracts of land which may be characterized by soil associations, broad vegetation types, and average annual rainfall characteristics [4]. The length of time required to successfully rehabilitate surface mined sites can also be expected to depend on essentially the same environmental factors that determine rehabilitation potentials. These times similarly should not be applied to specific sites.

Reclamation potential in the Northern Great Plains is highly variable even between broad areas. Higher rated response units (+3 to +9) which occur predominately in North Dakota, may require as little as one year to restore to agricultural cropland and five years to restore to mixed-grass range [4]. Medium-rated (+3 to -3) response units which dominate the moister areas of southeastern Montana and northeastern Wyoming may vary from five to 10 years, depending on whether the rehabilitation objective is to return the land to short-grass prairie, grass-shrub steppe, a mixture of these types or ponderosa pine. On lower response units (-3 to -9), such as those in northeastern Wyoming and northeastern Montana, from five to 15 years may be required to return the land to short-grass and/or shrub-steppe range. These time frames would be heavily influenced by rainfall patterns.

Assuming a direct correlation between the rehabilitation potential scale and time estimates, Table 5-24 estimates years to reclaim mined land to rangeland and cropland. Of importance here is the relative nature of time. Generally speaking, and assuming that the best technology available is applied, it would take longer to achieve reclamation in the San Juan River, Uinta-Southwestern Utah, and Denver-Raton Mesa Coal Regions. Revegetation to native species may require a much longer time period. It may not be possible to restore mixed native vegetation in the Northern Great Plains in less than 30 to 40 years [96]. Natural succession to coniferous and hardwood forest on old abandoned fields averages about 60 to 150 years, respectively, although present commercial forestry techniques have reduced this period by about 50 percent for both conifer and hardwood stands [9, 10]. Whether long-term postmining productivities can equal premining levels is unknown due to the relative infancy of timberland reclamation practices [10]. Reestablishment of ponderosa pine and mountain shrub types in areas where rainfall is favorable for plant growth and where deep fertile soils have developed (intermediate elevation zones in parts of Uinta-Southwestern Utah, Green River-Hams Fork, Powder River, and Denver-Raton Mesa Coal Regions) may not present a revegetation problem. Growth of pine trees and shrubs could reasonably be expected within 10 to 20 years in these areas [14].

In desert areas of the West, natural regeneration of the dominant plant species occurs only every five to seven years, and only when two better than average years occur in succession [14]. Natural ecological succession in deserts even when a seed source is close by and the disturbed areas are not extensive, requires from 20 to 50 years [14]. The National Academy of Science [14] indicates probabilities of reaching rehabilitation objectives for desert, sagebrush foothills mixed grass plains and ponderosa pine and mountain brush in the western region. These probabilities depend on the land use objectives, characteristics of the site, available reclamation technology, and the skill with which this technology is applied.

TABLE 5-24

ESTIMATED TIME REQUIRED TO RECLAIM MINED-LAND
(Western Regions) (a)

COAL REGION	RECLAMATION POTENTIAL(b)		TIME TO RECLAIM (years) (e)	
	WEIGHTED AVERAGE(c)	RANGE	RANGELAND	CROPLAND
Powder River	0.9	-2 to 5	10.0	5.0
Green River-Hams Fork	0.2	-2 to 4	10.0	8.0
Fort Union	3.4	1 to 8	8.0	5.0
San Juan River	-6.9	-8 to 3	14.0	14.0
Uinta-Southwestern Utah	-5.0	-5	14.0	13.0
Denver-Raton Mesa(d)	-5.0	-5	14.0	13.0

(a) Source: Reference Numbers 3 and 4.

(b) Based on scale of -8 to +8 developed in Reference Number 3.

(c) Based on total acres which would be mined through 1980 and reclamation potential of active mines.

(d) Same value as Uinta-Southwestern Utah Coal Region due to regional productivity and latitudinal similarities.

(e) In the Appalachian and Eastern Interior Coal Regions reclamation to the equivalent of rangeland could occur in 1-2 years and to prime cropland in 5-15 years.

In general, if sites are reshaped and left to natural succession, only sites in ponderosa pine and mixed grass plains have a moderate chance of revegetating in a short time. Successful revegetation in the desert is low even when existing technology is applied properly, and sagebrush revegetation is moderate. The chance of approaching the original ecosystem is moderate even on the best sites, and there is no probability of *complete* restoration anywhere.

5.3.2.2 Topography. An impact on the topography of an area would occur if a permanent change in the general configuration of the land surface were to result from coal related development. The concept of permanent change is a key factor in determining the topographic impacts of surface mining under the provisions of the Surface Mining Control and Reclamation Act (SMCRA). The environmental protection performance standards of that law (section 515(c)(3)) operate to mitigate the significance of topographic changes compared with those changes that would occur under conditions of no control.

During early activities in developing a coal mine, topographic changes would be limited to the grading required for access roads and for the preparation of the drill sites used to determine the overburden and coal-deposit dimensions. Holes are drilled at quarter-mile intervals; this involves approximately 35 holes per 1,000 acres of leasehold. Except in very rugged terrain, grading for access roads and drilling sites would involve a negligible portion of the leasehold.

Topographic impacts could also occur during premining site preparation and facilities construction. Cuts and fills could be required for coal haul roads and some surface grading might be needed for mine-support facilities such as offices, warehouses, shops, and equipment parking or storage areas. The amount of such changes would be highly dependent on the characterisitics of a particular site. However, the topographic changes resulting from these activities would not generally be extensive enough to significantly impact the topography of the area or any sizeable portion of it.

The extent of topographic disturbance due to coal extraction operations differs considerably between surface mining and underground mining. By far, the greater disturbance is associated with surface mining. Surface mining involves the removal of the overburden and the extraction of the exposed coal seam or seams. The primary impact of this activity would be the lowering of the surface in the area mined to depths that vary from a few feet to hundreds of feet, depending on the combination of overburden depth and coal seam thickness. If left in its surface-mined form, the area would suffer a significant topographic impact. However, SMCRA (section 515(b)(3)) requires that all overburden material be backfilled and graded to restore the approximate original contour of the land.

Section 515(b)(3) also covers provisions in SMCRA for instances where insufficient or excess overburden does not allow restoration of original contours. The geological nature of the overburden and the ratio of overburden thickness to coal seam thickness are factors that would determine whether there is excess or insufficient overburden. During excavation, the overburden material would be broken up and expansion of its volume, known as bulking, would occur. This overburden bulking (from 10 to 20 percent) could vary between regions, within regions, and even within a particular leasehold depending on the geological materials encountered. If a 20-foot coal seam were to be mined in an area that required the removal of 200 feet of overburden material having a 10 percent bulking factor, backfilling and grading of the overburden could restore the approximate original contour of the land with all highwalls, spoil piles, and depressions eliminated. If the ratio of overburden to coal seam thickness ratio were greater than the percent of overburden bulking, there would be excess overburden. Conversely, if the overburden to coal ratio were less than the percent of bulking, there would be insufficient overburden and a depression would remain after mining reclamation. Among the various coal regions, the Powder River Coal Region, with its 26-foot average seam thickness, would have a much higher proportion of lowered topography than the other regions. Surface lowerings of 25 to 40 feet have been experienced at some present mining operations in this region involving coal seams up to 70 feet thick with overburden thicknesses averaging 150 to 250 feet. The conditions of both hill and depression formation are covered under SMCRA, which requires that the overburden material be backfilled, graded, and compacted (where advisable) to the lowest

practicable grade but not more than the angle of repose.

Another area of topographic impact resulting from surface mining operations involves the general shape of the restored land. Regardless of whether the restored area is at the same elevation, raised, or depressed relative to the original elevation, the landforms resulting from restoration activities would have more smoothly contoured surfaces than the original landscape; most of the microrelief features, such as small ledges, rock outcrops, and natural steep banks, would be eliminated.

Underground mining could impact surface topography through deformation of the geologic strata above the coal extraction area. This could lead to lowerings of the surface, cracks due to tension, or bulges resulting from compression. These types of impacts could have a major effect on future use to which the land surface above the mine workings can be put. The type and magnitude of such surface changes is highly site-specific and cannot be generalized for any region. Conditions which affect subsidence include the nature of the rock formation and thickness of the overburden, the geometry of mine workings, coal-bed thickness and the rate of mining, and the direction in which any coal bed dips as seen at the point where it is exposed at the surface [17]. Underground mining activities can be designed to take into account those factors which influence subsidence processes. New techniques, such as the use of remote sensing imagery, are being developed to provide better information for evaluating mine ground stability and potential areas of subsidence [17,18,19].

Other activities associated with the coal development cycle such as plant construction, utility and transportation corridor construction, and employment-related factors might also produce topographic changes. New roads or rail lines might require cuts or fills; coal-conversion and electric-generation facilities would generally require site preparation in the form of some degree of surface grading or leveling; and community-development activities (housing, utilities, schools, etc.) associated with coal development would also involve a certain amount of surface grading. These changes would also be site dependent and the magnitude of such changes from a topographical basis should not be significant. The overall effect on topography would be moderate alterations in land contours of the acres involved.

It is not anticipated that the impacts in the topography of any region will differ significantly under any one of the program alternatives as compared with the other alternatives. In general, mining more coal increases the potential for topographic impact, especially when surface mining techniques are used. Hence, the chance of lasting topographic effects for each region is greatest under that alternative in which coal production from that region is maximum. As noted in section 5.1.3, it was assumed that the split between underground and surface mining (i.e., the percentage of coal extracted by each method) in each region would be the same for all alternatives. Therefore, when coal production in a given region varies as a result of interregional shifts, the amount of coal extracted by each method will change by a proportional amount. In each coal region, the alternative for which surface extraction is maximum will be the same as that for which overall production is maximum; minimum production by each method will also correspond with the alternative for which overall production is minimum.

5.3.2.3 Geology. Mining is the only activity in the coal development cycle in which significant geological impacts could occur. Although coal processing, transport, conversion, and use might produce minor topographic changes, the impacts of such changes would not be great enough to significantly alter the geologic character of an area.

In the mining phase, surface mining operations would produce significantly greater geologic impacts than underground operations. The exact extent of surface mining impacts would be directly related to the geological characteristics and thickness of the overburden, and cannot be generalized for a particular region. When overburden is broken up, removed, and later replaced, the geological structure and natural stratification of the overburden is destroyed and its physical and chemical properties are altered. Although such structural alterations would prevent any future scientific study of the original nature and structure of the overburden, much of the needed information would be collected during earlier development activities. Exploratory drilling includes the collection of core samples for mineralogical, physical, and chemical testing and also includes bore hole

testing to collect data on the seismic, gravimetric, and magnetic characteristics of the different underground strata. The breaking up of the overburden and the mining of coal could also affect groundwater through the disruption of any aquifers in the overburden material or in the coal itself. This area of impacts is described in detail in Section 5.3.2.6.

Paleontological resources could be affected by the disturbance, destruction, or removal of fossil material from overburden during stripping and backfilling operations. The exposure of fossiliferous rocks that might occur in association with conjuctive activities could also lead to losses resulting from unauthorized fossil collecting and vandalism. The significance of impacts on paleontological resources from stripping operations cannot be meaningfully assessed without data collection guidelines, assessment procedures, and evaluatory criteria. The Bureau of Land Management and the U.S. Geological Survey are currently developing a mechanism to provide for the protection of paleontological resources on Federal lands. The overall impacts from a geological standpoint would be minimal. Likewise, paleontological resources in any coal region should sustain only minimal impacts, although some specific sites might be adversely affected.

Another category of potential geological impacts involves the Department of the Interior's Natural Landmarks Program that affects other Federally designated scenic and natural areas. A certain number of these areas would be considered as unsuitable for coal mining under the lands unsuitability criteria set forth in Table 3-1 above. Scenic Federal lands designated by visual resource management analysis as areas of outstanding scenic quality and/or of high visual sensitivity - Class I or II - but not currently on the National Registry of Natural Landmarks would, in general, also be considered unsuitable for coal mining. An exception is that a lease may be issued in a scenic area only if the land management agency determines that: (1) the area or site is only of regional or local significance and the state concurs that leasing may be permitted; (2) the use of appropriate mining technology would result in no significant adverse impact to the area or site; and (3) the mining of the coal resource would enhance information recovery (e.g., paleontological sites). The extent of the areas that would be considered as unsuitable for coal mining because of their natural or scenic qualities cannot be determined at the programmatic level.

The objective of the Natural Landmarks Program is to assist the preservation of the various categories of significant natural areas which would illustrate the diversity of the country's natural history. The types of nationally-significant geological features that could qualify for natural landmark designation are outstanding formations significantly illustrating geologic processes, significant fossil evidence of the development of life on earth, and examples of the scenic grandeur of our natural heritage [20]. Efforts to inventory significant landmarks of all the natural regions are continuing through a variety of natural-region theme studies. It is not possible at present to determine the magnitude of potential impacts on these landmarks without specific data on all of the sites where mining will occur. The nature of the landmark would be a factor in determining whether coal development activities would cause a significant impact. For example, a landmark which owed part of its significance to the ability to view it from a particular vantage point could be impacted by the visual intrusion of man-made structures or terrain alterations while a significant fossil area could remain unaffected by such activities so long as they did not physically disrupt the fossil formations.

In general, all of the activities in the coal development cycle contain elements which could possibly affect natural landmarks. However, surface mining activities would present the highest probability of potential impacts. Thirteen landmarks currently included on the National Registry of Natural Landmarks have been reported to be threatened by various types of surface mining [21]. Although only one of these sites specifically involved coal mining, these cases are illustrative of potential coal development impacts on designated natural landmarks. Coal development activities could also alter a site so as to preclude its possible designation as a natural landmark. Other activities which would have potential for landmark impacts include uncontrolled fossil collection due to mine-related population increases and community developments which could preempt the designation of an area as a natural landmark.

As with topographic impacts, increasing the amount of coal mined heightens the potential for

significantly affecting an area's geology. The greatest potential for adverse impacts in paleontology and natural landmarks exists in the West. This section has long been known for its diversity of natural formations and unusual geologic features; with its low population density, many scenic attractions remain open to uninterrupted view. While fossil remains are found throughout the U.S., the likelihood of still undiscovered remains is greater in the abundant open spaces of the West. On judgement, then, the potential for unanticipated adverse geologic impacts is greatest for those alternatives that call for mining the largest amounts of western coal.

5.3.2.4 Minerals. Mineral resources would be impacted by their extraction, by the establishment of conditions which preempt any future development, or by conditions which delay their development. The major impacts of any Federal coal management program would be the permanent depletion of coal as a nonrenewable resource through the production and consumption of the tonnages of coal associated with each of the alternatives. Additional minor impacts would occur through the use of sand and gravel or other materials for road-base material and as construction aggregate. These materials would be required in varying quantities in all activities of the coal development cycle and in any community development that would occur due to coal development. Although the requirements are not known at this time, regionally significant impacts would not be expected because of the widespread availability of these construction materials. Hence no region is likely to experience significant depletion nor would major differences occur under the various alternatives.

Both surface and underground mining have the potential to preempt future development of other mineral resources. The magnitude of any preemption cannot be estimated for any region. The factors that determine what and how much of a mineral is thus preempted depend on the specific sites chosen for mining coal. These factors include the mineral-resources in a surface mine overburden and the location of any deep coal bed relative to other mineral commodities above or below it. An example of potential preemption by surface mining operations can be illustrated by the Wasatch and Fort Union Formations in the Wyoming portion of the Powder River Coal Region. Uranium and coal have both been found in these formations. The stripping of overburden to reach a coal seam would intermix any uranium with the rest of the overburden and eliminate the possibility of any future uranium extraction. The uranium occuring under such conditions usually consists of deposits that are presently uneconomical to recover. However, if future uranium market conditions or uranium extraction technology were to change to make recovery of this deposit economically attractive, such recovery would have been preempted by the intermixing with the rest of the overburden. The extent to which this might occur for uranium or other minerals cannot be projected for any of the coal regions since it is dependent on the specific mineral characteristics of individual leaseholds. Mineral development preemption could also occur with the development of new communities or the expansion of existing communities if such development were to occur above mineral deposits so that they could not feasibly be mined.

Coal mining operations could also conflict with oil and gas recovery operations, either by preempting development or by delaying development for the life of the coal mining project. In a few instances, coal deposits occur below or at the same approximate level as a commercial oil or gas deposit. Simultaneous operation of a coal mine and a producing oil or gas field have presented some difficulties. Regulations [30 CFR 211] have been established by the Geological Survey to deal with these situations. Standard drilling procedures would not interfere with underground coal operations if coal seam intersections were properly cased. Standard casing would seal underground workings so that no hydrocarbon vapors could enter the coal seam from the well to create safety problems.

There is sometimes a particular sequence in which the extraction of two resources from the same area should occur. Where a mining operation follows the extraction of petroleum products, for example, the location of oil and gas wells would have to be determined by the mining company in order to leave safety pillars around the wells. It should be noted that in cases of coal mining requiring sequential extraction, it is generally more prudent, for technological reasons, to extract the coal resource before the oil and gas resource.

5.3.2.5 Soils. Coal mining activities could cause soil impacts ranging from minor, short-term disturbances to significantly adverse, long-term alteration of soil characteristics. Stripping or grading operations could drastically alter soil characteristics through the mixing of the soil with the subsoil and underlying rock material. However, distinct strata of topsoil could be saved for use in reclamation, thereby increasing the productivity potential of mined lands in the postmining phase. The natural soil structure would be broken up, soil compaction would cause lower permeability, soil microorganism would be buried, and nutrient cycling and established soil climate relationship could be completely altered. Overburden removal could also bring to the surface and mix with the soil those elements that are either toxic to plant growth or toxic to animal life that feed on the plants.

All land disturbances would result in the exposure of a range of soil materials of varying particle size to the action of wind and water. Soil productivity, permeability, and rates at which moisture infiltrates would be reduced, thereby increasing runoff, soil erosion, and sedimentation. Wind action, which is variable both among the regions and within a single region, would cause fine soil particles (silt and clay) to be lifted into the atmosphere, reducing air quality and increasing soil loss. However, estimates of impacts on soils can only be made for each site on an individual basis after haul roads, plant facilities, utility corridors, and other mine development activities have been identified.

Because of the provisions of Section 406(a) and Section 508 (a)(5) of the Surface Mining Control and Reclamation Act that pertain specifically to topsoil handling and restoration, potentially adverse soil impacts such as removal of too much topsoil and improper soil substitution and compaction can be minimized. The mining and reclamation plan for a particular leasehold must include soil surveys provided by the lessee. Such surveys would identify physical and chemical characteristics together with the geographic extent of the leasehold soils to provide the basis for an effective reclamation plan. The wide variability of soil types is well illustrated by the proposed mining and reclamation plan for a Powder River Coal Region mine. This plan included a soil survey that identified 28 different soil types within a 5,800-acre leasehold [22].

5.3.2.6 Water Impacts. Water requirements in the 12 coal regions reflect the degree of coal development in each region. The total water withdrawal required yearly under the no new leasing alternative would range (depending upon the level of production assumed) from 3.1 million acre-feet to 3.7 million acre-feet in 1985. By 1990, the range would be from 3.4 million to 4.8 million acre-feet (Tables 5-25 and 5-26). Not all of this water would be lost to further use; much of it would be returned to the source, as, for example, after it had been used in washing coal or for cooling purposes at a power plant. The amount of water used up in coal-related activities represents what is termed consumptive-use and is shown for the 12 coal regions under the no new leasing alternative in Table 5-28.

Both water availability and water quality would be affected by a Federal coal management program. Water to meet mining, cleaning, and conversion needs would be drawn from available surface water and groundwater sources. Depending on local conditions, these water sources may or may not be adequate to support the increase in coal development activities projected for 1985 and 1990. Following its use, some volume of water would be discharged to the environment. The quality of this fluid would have been changed during its use. Such quality changes may include the addition of total dissolved solids, including heavy and trace metals as well as the more common cations and anions (electrically charged particles in solution), the lowering of pH (i.e., of alkalinity so as to make the water more acidic), and the addition of heat. Even with controls, some release of these substances would occur either directly into surface or ground waters or indirectly by being leached from solid waste or disposal sites. Use of water could also increase salinity and concentrations of pollutants downstream from the point of where the water was diverted for use. Additional water degradation may occur as a result of mine drainage and runoff from storage, overburden, and spoil piles.

Coal seams are frequently found in close proximity to usable aquifers. In some cases, the coal beds themselves may constitute an aquifer. Disruption of rock strata during mining may therefore cause substantial changes in groundwater

TABLE. 5-25

NO NEW LEASING ALTERNATIVE
WATER MAKEUP (WITHDRAWAL) REQUIREMENTS
(EASTERN COAL REGIONS)
(1000 acre-feet per year)

COAL REGION	1985			1990		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Northern Appalachian	566.2	563.8	565.1	559.4	651.0	663.0
Central Appalachian	186.9	212.1	211.0	242.5	309.7	309.3
Southern Appalachian	265.6	355.1	352.7	264.3	392.3	397.1
Eastern Interior	497.9	516.6	542.2	554.6	582.0	558.7
Western Interior	286.0	367.4	378.0	310.2	597.0	586.4
Texas	310.7	471.0	474.0	397.0	864.0	840.6

TABLE 5-26
NO NEW LEASING ALTERNATIVE
WATER MAKEUP (WITHDRAWAL) REQUIREMENTS
(WESTERN COAL REGIONS)
(1000 acre-feet per year)

COAL REGION	1985			1990		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
San Juan River	30.7	32.6	51.6	38.4	42.1	52.4
Uinta-Southwestern Utah	58.8	61.8	70.9	76.4	74.7	76.6
Green River-Hams Fork	55.2	66.7	68.2	66.2	64.4	70.4
Powder River	67.7	71.6	84.4	92.4	91.6	110.0
Fort Union	61.9	55.5	114.9	93.5	138.2	154.9
Denver-Raton Mesa	54.3	67.0	75.7	78.3	101.5	92.8
Others	556.3	600.4	680.8	631.2	906.8	887.1

flow conditions with potentially important impacts on drinking water supplies and receiving surface water bodies.

An increased population and industrial growth associated with coal development would exert additional water demands and would introduce quantities of salts, nutrients, organic materials, bacteria, pesticides, trace elements, heavy metals, etc. into surface waters, and could overtax existing sewage treatment facilities. Actual impacts on both water supply and quality would depend on features of the individual situation, such as streamflow characteristics and present water quality. Depending on the local characteristics, the impacts at a specific site where water is used may be more or less severe than the effects on the region as a whole, which reflect usage at many different locations. For conversion facilities and mines located near the upper reaches of streams where the flow is low, impacts on water quality could be significant.

This analysis of water availability is based on preliminary data on water flow and consumptive water use compiled by the U.S. Water Resources Council [23].

Each water system, consisting of a major river and its tributaries, drains a particular area of the United States. The runoff from rainfall and melting snow, as well as the streamflow from smaller moving bodies of water such as those fed from underground springs, finds its way into the river as it moves through that area. This drainage area is termed a watershed (sometimes also called a "basin"), usually named for the principal body of water draining it. Examples of major watersheds include the upper Missouri River Basin in the Northern Plains states and the Ohio River Basin in the East. Watersheds are defined by the conditions of stream flow, which in turn reflect geologic and topographic features of the land, and do not correspond to the coal regions into which the country has been divided for purposes of this statement. Data of the Water Resources Council (WRC), like most information on water availability and use, are organized in terms of watersheds. Each major watershed in the United States is divided into subunits, called aggregated subregions (ASR). The ASRs are listed in Appendix E. These are, in general, smaller than the coal regions and provide the best basis for relating water data to the regions, through the ASRs which most nearly match or overlap with the latter. For example, the Uinta-Southwestern Utah Coal Region spans both ASRs 1401 and 1402. The amount of water available to that region can be obtained by summing the data from these two ASRs.

Since water supply and water quality in a region is affected by all upstream uses, it is also necessary to identify the regions which are located in the lower or central areas of watersheds. In order to obtain a realistic analysis of future water supply in such regions, the future upstream consumptive demands must also be determined. For instance, the Green River-Hams Fork Coal Region is also contained in ASR 1401, upstream from the Uinta-Southwestern Utah Coal Region. Therefore, any future increases of consumptive water requirements in the Green River-Hams Fork Coal Region (including coal development under any of the alternatives) would deplete the water supply flowing through the Uinta-Southwestern Utah Coal Region. Additionally, parts of the San Juan River Coal Region (contained in ASR 1403) are downstream from both the Green River-Hams Fork and Uinta-Southwestern Utah Coal Regions. As a result, any future increases of consumptive water requirements in ASRs 1401 and 1402 would decrease the water flow, and hence, availability, to those parts of the San Juan River Coal Region. This means that water consumption for coal development and for nonenergy-related developments in the Green River-Hams Fork and Uinta-Southwestern Utah Coal Regions must be deducted from future supplies in the San Juan River Coal Region. The ASRs used in the analysis of each coal region are listed in Table 5-27. The points in the ASRs at which the flows are measured are shown in Figure 5-2 and are listed in Appendix E.

The total stream flow, estimated present and future water requirements (without coal development), and the description of the ASRs used in this analysis are contained in Appendix E. The water flows that are shown in the tables of Appendix E are not necessarily readily available for consumption. Much of it must remain available for supporting fish and wildlife habitats, insuring navigability, and maintaining water quality. Additional amounts are held in reserve under the separate systems of water rights law within each state and within appropriate interstate water compacts. In addition, the location of the point at which water is required within a basin may affect

TABLE 5-27

COAL REGIONS AND CORRESPONDING AGGREGATED SUBREGIONS (a)

Coal Region	ASR	Watershed
Northern, Central, and Southern Appalachian	502 plus 601	Upper Ohio and Upper Tennessee Rivers
Eastern Interior and Appalachian	505 plus 705 minus 507, 602, and 1011	Upper Mississippi and Ohio Rivers at St. Louis, Mo., but excluding the Missouri, Tennessee, and Cumberland Basins
Western Interior, Powder River, and Fort Union	1011 plus 1104	Missouri and Arkansas Rivers
Texas	1107 plus 1201, 1202, 1203, 1204, and 1205	Texas Gulf and Red River
Powder River	1004	Yellowstone River
Powder River and Fort Union	1005	Upper Missouri River
Green River-Hams Fork	1401	Green River
Green River-Hams Fork and Uinta-Southwestern Utah	1401 plus 1402	Green River and Upper Mainstem Colorado River
Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan River	1403	Upper Colorado River at Lee's Ferry, Arizona
Denver-Raton Mesa	1007 plus 1102	Upper Platte and Upper Arkansas Rivers

(a) Source: Derived from Reference Number 23.



FIGURE 5-2

STREAM FLOW MONITORING POINTS

the water availability. Even though there may be a net water surplus in the basin as a whole, local areas within the basin may experience water shortages while others have surplus supplies.

Some of the most important limiting factors on water use in western states are legal constraints. Since water is relatively scarce in these western states, an intricate system of compacts and water laws has been developed to divide the existing water both between states and within states. This system is quite complex and subject to many interpretations of key issues [24,25,26,27,28,29]. Major issues include the extent of Indian and Federal water rights,[1] the amount of water available for division among the states, and the ease with which water rights may be changed from one use to another.

Indian water rights represent a particularly complex issue which in some coal regions could play a critical role. Indian claims of title to groundwater should be noted as representing an issue which affects coal development, in particular in the San Juan River Coal Region. In general, water rights in the western states are governed by the doctrine of prior appropriation, in which the first water user in a basin has the first right to use the water during periods of shortage. Many of the streams in the West are already over-appropriated, or appropriated to the extent that users with new rights are not guaranteed a water supply during periods of low flow. Procedures for transferring water rights with early priority dates vary in complexity from state to state. In many cases the rights may be transferred without excessive difficulty as long as all parties are willing [25]. However, most western states have provisions designed to protect the rights of other water users which could complicate transfer proceedings if another appropriator in the basin objects to the transfer [30].

One other consideration in the evaluation of water availability is that the calculated future flows determined by the Water Resources Council (WRC) are based on historical flows and, therefore, contain the implicit assumption that the amounts available would continue in the same pattern as they did during the period of record upon which the total stream flows are derived. As water supply needs change, reservoir operations would likely be modified to meet these needs. Maintenance of in-stream flow requirements could also necessitate changes in current operating patterns. New reservoirs may be built in an attempt to ensure more constant water supplies for coal or other developments, although it should be noted that proposals to build new reservoirs often produce extensive opposition on environmental grounds. In addition, some existing reservoirs in the coal regions already have significant amounts of unused water storage reserved for industrial purposes. For example, the U.S. Bureau of Reclamation has approximately 650,000 acre-feet in the Yellowtail Reservoir (Big Horn Lake) adjacent to the Powder River Coal Region that are reserved for industrial options, but are not currently used [31]. Although optional management of existing reservoirs or additions of new reservoirs should allow more even distribution of runoff through the year, no new water is "created." In semi-arid regions open water evaporation may dramatically decrease total supplies, but the water that remains can be used more efficiently, due to the water containment and storage structures.

In order to compare the regional amounts of water that will be used up in coal-related activities with the available supply, the estimates of regional consumptive requirements (as given in Table 5-28) have been converted to requirements in each of the watersheds which will furnish the water. Table 5-29 expresses these requirements for the no new leasing alternative. The interrelationships between coal regions and watersheds shown in Table 5-27 were used to provide estimated requirements at each level of production. The results in Table 5-29 were then compared with estimates from the WRC as to water availability in 1985. However, there was a complication in using WRC data as is discussed next.

The future flows calculated by the WRC represent the amount of water that will discharge from the watersheds in 1985 after all consumptive uses have been accounted for. The Council's figures on consumption already include estimates of water used in the production of energy, including the mining and utilization of 1.1 billion tons of coal in 1985. This independent estimate for

[1]The Indian tribes of the Northern Great Plains have claimed prior and paramount rights to all waters which flow through, arise on, or border their reservations. These claims are based on the United States Supreme Court decision in the case, *Winters vs. United States*, 207 U.S. 564 (1908). The claims and similar competing interests between the state and Indian water rights in other regions will have to be resolved in the courts.

TABLE 5-28

NO NEW LEASING ALTERNATIVE
CONSUMPTIVE WATER REQUIREMENTS BY COAL REGION[a]
(1,000's of acre-feet)

COAL REGION[b]	1985			1990		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Northern Appalachian	566.2	563.8	565.1	559.4	651.1	962.0
Central Appalachian	186.9	212.1	211.0	242.5	309.8	351.2
Southern Appalachian	265.6	355.1	352.7	264.3	392.6	489.2
Eastern Interior	497.9	516.6	542.2	544.6	578.6	659.7
Western Interior	286.0	367.4	378.1	310.2	580.2	643.9
Texas	310.7	471.0	474.0	397.1	850.7	917.9
San Juan River	30.7	32.6	51.6	38.9	41.6	90.7
Uinta - Southwestern Utah	58.8	61.8	70.9	77.9	70.8	95.4
Green River - Hams Fork	55.2	66.7	68.2	66.0	58.6	65.1
Powder River	67.7	71.6	84.4	92.4	90.1	99.6
Fort Union	61.9	55.5	114.9	93.2	141.7	149.2
Denver - Raton Mesa	54.3	67.0	75.7	78.3	99.2	103.4
Others	556.3	600.4	680.8	630.8	879.2	1,181.5

(a) Coal-related activities only.

(b) In regions where water deficits occur, application of best available water recycling technology could result in savings of up to 50% of the amount shown.

TABLE 5-29

NO NEW LEASING ALTERNATIVE
CONSUMPTIVE WATER REQUIREMENTS BY WATERSHED[a]

(1000 acre-feet per year)

WATERSHED(S)[b]	1985			1990		
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Upper Ohio & Upper Tennessee Rivers	826	920	927	871	1120	1150
Upper Mississippi (above St. Louis) & Ohio River	1238	1349	1380	1328	1597	1609
Missouri & Arkansas Rivers	419	499	582	511	822	837
Texas Gulf & Red River	277	421	424	355	775	753
Yellowstone River	60	63	74	82	77	96
Upper Missouri River	115	111	175	165	198	232
Green River	49	60	61	59	56	63
Green River & Upper Mainstem Colorado River	102	113	120	127	118	127
Upper Colorado River at Lee's Ferry, Arizona	129	142	166	161	154	173
Upper Platte & Upper Arkansas Rivers	47	58	65	68	88	79

(a) Aggregated from Table 5-28 using regional watersheds in Table 5-27; coal-related activities only.

(b) See Appendix E.

coal use is close to that projected for the no new leasing alternative at the medium level of production. An attempt was therefore made to use the WRC watershed data as surrogates for assessing the impact of this alternative.

In seven of the 10 watersheds and watershed combinations, estimates by WRC, as shown in Table 5-30, for all energy-related activities exceed the projections in Table 5-29 for coal-related activities alone. Therefore, the WRC estimates for these watersheds may reasonably be assumed to encompass the consumptive water requirements in 1985 for coal development under the alternative of no new leasing at the medium level of production. The results are shown in Tables 5-33 through 5-38 and in Table 5-40.

For three of the watershed combinations, however, the demand calculated for coal alone (as given in Table 5-29) exceeds WRC estimates of demand for all energy-related activities. These three watershed combinations are the Upper Ohio and Upper Tennessee, the Upper Mississippi and Ohio, and the Green River and Upper Mainstem Colorado River. Several options for dealing with this problem exist. The safest approach, in that it minimizes the danger of underestimation, is to add the consumptive requirements projected for coal alone (as given in Table 5-28 and 5-29) under the no new leasing alternative to those calculated by WRC for all energy sources. This approach will overstate the total water requirements by an unknown amount, because the WRC estimates have already included some requirements related to coal. The actual amount overestimated is unknown, however, and cannot be subtracted out. The comparision of water needs with water availability will represent, therefore, a worst-case estimate.

The results of using this approach are shown for the three combined watersheds in Tables 5-31, 5-32 and 5-39. In these tables, estimates of annual water production, based on the no new leasing alternative at the medium level of production, were divided by 12 to obtain average monthly values.

It will be noted in Tables 5-31 through 5-40 that monthly predictions of water flow (after accounting for all consumptive uses) are given in terms of both the mean or average level and the 95 percent level. The latter figure is based on the estimated 20-year low flow and represents the volume of water that is expected to be exceeded during the specified month in 19 years out of 20. It is, of course, not possible to predict from past records in what year the low flow would occcur nor to guarantee that values below the 95 percent level would occur only at 20-year intervals.

As can be seen from the tables, demand exceeds supply for six of the ten combined watersheds. All of these are west of the Mississippi River. The only western watersheds for which deficits are not predicted are the Upper Missouri and the Green River and Upper Mainstem Colorado (already noted). These deficits would occur during the summer months when the patterns of precipitation and runoff result in minimum stream flow. While many Western streams also experience low flows in the winter, this condition apparently does not result in as severe a regional depletion of supplies as low flows in the summer. Except in the Texas and Denver-Raton Mesa Coal Regions (Tables 5-18 and 5-40), these deficits would occur only at the 95 percent level and would not exist during most years. The deficits would not be eliminated under any of the alternatives which call for less consumptive use of water in some of the regions, as shown in Table 5-41. On a monthly basis, none of the reductions from the no new leasing alternative are enough to offset the deficit. Indeed, the water impact expected under any given alternative (at the medium level of production) are not appreciably different from those expected under any other.

Before discussing impacts on a geographical basis, several of the uncertainties inherent to the methodologies should be highlighted. One of the most important is the lack of information on the probable margin of error in WRC estimates. The percent change in water consumption from one alternative to another, which can be considered as statistically significant, is therefore difficult to address. As stated earlier, while a deficit may not be predicted for a given watershed (therefore, water should still physically flow in the major streams) under coal development, other constraints may affect water availability. Legislatively mandated flow requirements for pollution control and conservation needs, interbasin allocation agreements, and recreational considerations will all affect how much water can be taken from the streams and consumed for coal development. These constraints are exceedingly difficult to address on a region basis; however, other supplies

TABLE 5-30

WATER RESOURCES COUNCIL PROJECTED CONSUMPTIVE WATER REQUIREMENTS IN 1985
(1000 acre-feet/year)

Watershed [a]	Fuels Mining	Petroleum Refining	Steam Electric Generation	Total [b]
Upper Ohio and Upper Tennessee Rivers	74	18	435	528
Upper Mississippi and Ohio Rivers	96	52	1040	1190
Missouri and Arkansas Rivers	215	73	463	751
Texas Gulf and Red Rivers	697	257	373	1330
Yellowstone River	38	6	38	82
Upper Missouri River	67	7	62	136
Green River	31	0	54	85
Green River and Upper Mainstem Colorado River	36	0	54	90
Upper Colorado River	63	0	119	182
Upper Platte and Upper Arkansas Rivers	48	8	89	146

(a) These watersheds correspond to those listed in Table 5-27. See Appendix E.
(b) Totals may not add due to rounding. Water use for synthetic fuel production and irrigation is not included.

TABLE 5-31

PREDICTED WATER FLOW IN THE UPPER OHIO AND UPPER TENNESSEE RIVER BASINS*, CONTAINING THE NORTHERN, CENTRAL AND SOUTHERN APPALACHIAN COAL REGIONS, 1985

(1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	11,500	3,340
February	13,700	5,660
March	15,800	7,260
April	12,800	6,500
May	8,900	4,010
June	6,350	2,890
July	4,540	2,220
August	3,960	1,840
September	3,160	1,520
October	3,200	1,420
November	4,640	1,780
December	8,020	2,190
Annual [b]	96,500	62,800

* See Appendix E.

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-32

PREDICTED WATER FLOW IN THE UPPER MISSISSIPPI AND OHIO RIVER BASINS*, CONTAINING THE EASTERN INTERIOR AND APPALACHIAN COAL REGIONS, 1985
(1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	21,650	5,550
February	29,250	10,850
March	32,400	15,600
April	34,900	21,500
May	23,200	12,200
June	18,100	9,690
July	13,100	6,260
August	7,520	3,650
September	6,510	3,580
October	6,580	2,110
November	9,250	2,310
December	13,150	3,620
Annual[b]	214,400	121,400

*ASRs 505 plus 705 minus 507, 602, and 1011. (See Appendix E.)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-33

PREDICTED WATER FLOW IN THE MISSOURI AND ARKANSAS RIVER BASINS*, CONTAINING THE WESTERN INTERIOR, POWDER RIVER, AND FORT UNION COAL REGIONS, 1985 (1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	4,160	1,050
February	5,350	1,510
March	7,360	2,380
April	9,880	2,900
May	10,300	3,080
June	9,510	2,640
July	4,180	740
August	539	- 50
September	2,910	740
October	4,420	1,200
November	4,480	1,300
December	3,650	1,060
Annual [c]	66,700	22,700

*ASRs 1011 and 1104. (See Appendix E.)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-34

PREDICTED WATER FLOW IN THE LOWER RED, SABINE, NECHES, TRINITY, BRAZOS, COLORADO AND NUECES RIVER BASINS*, CONTAINING THE TEXAS COAL REGION, 1985
(1000s of acre-feet)

PERIOD	CALCULATED FLOW(a)	
	MEAN	95%
January	4,460	706
February	5,970	1,060
March	5,830	1,205
April	6,170	1,040
May	8,480	940
June	5,030	240
July	1,850	- 460
August	- 879	-1,840
September	876	-2,520
October	2,010	11
November	2,530	185
December	3,650	362
Annual(b)	46,700	9,040

*ASRs 1201, 1202, 1203, 1204, 1205, and 1107 (See Appendix E)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-35

PREDICTED WATER FLOW IN THE YELLOWSTONE RIVER BASINS*, CONTAINING THE POWDER RIVER COAL REGION, 1985
(1000s of acre-feet)

PERIOD	CALCULATED[a]	
	MEAN	95%
January	297	159
February	387	182
March	658	296
April	527	214
May	945	490
June	2,100	973
July	1,100	165
August	164	-114
September	167	- 62
October	372	185
November	422	283
December	315	188
Annual[b]	7,430	3,670

*ASR 1004 (See Appendix E)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-36

PREDICTED WATER FLOW IN THE UPPER MISSOURI RIVER BASIN*, CONTAINING THE POWDER RIVER AND FORT UNION COAL REGIONS, 1985
(1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	621	275
February	518	143
March	777	281
April	1,225	466
May	1,361	531
June	1,054	292
July	1,046	378
August	1,064	318
September	1,274	556
October	1,462	618
November	1,454	465
December	729	339
Annual [b]	12,600	4,600

*ASR 1005 (See Appendix E)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-37

PREDICTED WATER FLOW IN THE UPPER COLORADO RIVER BASIN*,
CONTAINING THE GREEN RIVER-HAMS FORK,
UINTA-SOUTHWESTERN UTAH,
AND SAN JUAN RIVER COAL REGION, 1985
(1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	712	136
February	744	477
March	778	342
April	1,235	176
May	1,232	-114
June	1,157	16
July	842	14
August	720	-105
September	729	- 54
October	659	131
November	752	166
December	777	145
Annual[b]	10,340	3,510

*ASR 1403 (See Appendix E)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-38

PREDICTED WATER FLOW IN THE GREEN RIVER BASIN*, CONTAINING THE GREEN RIVER-HAMS FORK COAL REGION, 1985 (1000s of acre-feet)

PERIOD	CALCULATED FLOW	
	MEAN	95%
January	183	68
February	232	97
March	260	103
April	424	133
May	738	360
June	873	333
July	351	72
August	77	- 41
September	115	33
October	182	60
November	181	82
December	177	60
Annual(b)	3,790	1,630

*ASR 1401 (See Appendix E).

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-39

PREDICTED WATER FLOW IN THE
UPPER COLORADO MAINSTEM AND GREEN RIVER BASINS*,
CONTAINING THE GREEN RIVER-HAMS FORK AND
UINTA-SOUTHWESTERN UTAH COAL REGION, 1985
(1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	351	218
February	410	260
March	467	288
April	936	533
May	1,960	1,370
June	2,260	1,450
July	877	460
August	313	140
September	262	135
October	408	247
November	394	277
December	361	222
Annual[b]	9,050	3,930

*ASRs 1401 and 1402 (See Appendix E)

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

TABLE 5-40

PREDICTED WATER FLOW IN THE UPPER ARKANSAS AND UPPER PLATTE RIVER BASINS*, CONTAINING THE DENVER-RATON MESA COAL REGION, 1985 (1000s of acre-feet)

PERIOD	CALCULATED FLOW[a]	
	MEAN	95%
January	94	52
February	110	63
March	123	71
April	103	47
May	183	75
June	290	127
July	- 35	-100
August	-109	-157
September	18	- 42
October	118	72
November	108	65
December	99	63
Annual[b]	1,100	1,000

*ASRs 1007 and 1102 (See Appendix E).

Note: Flow after all uses including irrigation.

(a) Calculated flow is the difference between the water entering and the total water depletions in the watershed(s) that contain the region. It is the estimated amount of water that would flow out of the basin as measured at the point of discharge. Negative values indicate water deficits which would necessitate at least temporary reduction in upstream consumption. Positive values do not necessarily imply that the water is available for use, since water availability also depends on such factors as minimum in-stream requirements; water quality; and water law as determined by each state and by compacts between the states (see text).

(b) Annual totals may not equal the sum of the individual months due to accumulated round-off error. The annual 95 percent flow does not equal the sum of the monthly 95 percent flow.

Source: Adapted from Reference Number 23.

may become available in the future through conservation efforts in the highly consumptive irrigation sector, properly managed lease sale groundwater developments, and through effective surface water storage systems.

Impacts - No New Leasing Alternative. The total regional water requirements reflect the degree to which coal development is supported by each region. The 1985 consumptive water requirements for the no new leasing alternative high option range from a low of 59,000 acre-feet per year in the San Juan River Coal Region to a high of 453,000 acre-feet per year in the Eastern Interior Coal Region (see Table 5-28). The requirement for 588,000 acre-feet shown for other areas is due to coal consumption in nonproducing areas and is distributed throughout the remaining areas of the United States.

Based upon predicted water flow data in Table 5-31, the water supply in the Northern, Central, and Southern Appalachian Coal Regions (the Upper Ohio and Upper Tennessee River Basin) is more than sufficient to support projected coal related development. The yearly requirement in 1985 for the high option (about 927 thousand acre-feet, see Table 5-12) is less than two percent of the extreme low flow (95 percent low flow or the flow which is exceeded during 19 out of every 20 years, on the average) for the watershed (about 63 million acre-feet). The 20-year low flow for October is about 1.4 million acre-feet and the average monthly requirement is about 8,000 acre-feet. Even under such low-flow conditions, the monthly flow is not expected to go below 1.3 million acre-feet per month. In addition, the Southern Appalachian Coal Region may be able to obtain water from the Black Warrior and Coosa River systems and the Northern Appalachian Coal Region may obtain some water from the Susquehanna River, none of which has been included in this analysis. Although estimates of water flow in 1990 are not available, it appears that the additional requirements for the no new leasing alternative (as shown in Table 5-29) would not present any significant problems at the regional level. About 80 percent of the water withdrawals in the Appalachian Regions would be consumptively used (Tables 5-26 and 5-28). The remainder (between 190 and 210 thousand acre-feet) would be discharged as waste fluid to surface water. Even if discharges would meet Federal and state regulations, local pollution problems may develop. These could be of particular concern when summer low flows are insufficient for waste assimilation. Additional controls may then be required to maintain ecosystem health and productivity during times of critical flow.

The situation is similar for the water requirements of the Eastern Interior Coal Region, which is supported by the Upper Mississippi and Ohio River Basins (see Table 5-32). Since the Ohio River Basin also supports the water requirements for a large portion of the Appalachian Coal Regions, the water requirements for all three Appalachian Coal Regions were combined with those of the Eastern Interior Coal Region in Table 5-32. This results in the presentation of a worst-case situation since at least some of the water supply for the Northern and Southern Appalachian Coal Regions would be developed from sources not included in the table. However, even this extra demand could be supplied. The 1985 annual requirement for the combined regions is estimated to be 1.4 million acre-feet for the high option. This is less than 1.2 percent of the calculated 20-year low flow of the two basins (about 121 million acre-feet). In no case would the monthly requirement exceed 10 percent of the monthly low flow. Some local problems, however, may occur where stream flow of individual rivers may not be able to support the coal mining demands. Large supplies of groundwater are available to meet these localized demands [32,33], though groundwater quality may not be adequate for some uses, such as steam conversion. High consumptive use of the water (over 80 percent) will result in relatively low effluent discharge. Some pollution problems may, however, exist in smaller streams.

The Missouri and Arkansas River Basins support the water requirements of the Western Interior, Denver-Raton Mesa, Powder River, and Fort Union Coal Regions. Table 5-33 summarizes the impact of coal development in these regions on the Missouri and Arkansas River Basins. There is one month (August) during which water demand may exceed surface water supplies in the Arkansas River Basin based on a 20-year low flow. At present, this demand is met by extensive ground water mining, and by flow averaging using the numerous reservoirs contained in the region. Additional coal development such as is predicted with the high production projections would further add to these deficiencies; however, even the

expected water requirements in 1990 would not cause net regional deficits in other months. On a local level, surface supplies from smaller subwatersheds may be insufficient to meet the seasonal needs of coal mining and utilization facilities. This maximum demand would equal less than 20 percent of the unused mean monthly flow in all months except August. On an annual basis, less than one percent of the average flow and less than three percent of the 20-year low flow would be required for the high option in 1985.

Consumptive use of water withdrawals for the no new leasing alternative is close to 90 percent in the Missouri and Arkansas River Basins (as can be seen by Tables 5-26 and 5-28 for the regions affected). During periods of low flow, local streams may not be able to provide sufficient flow to dilute the effluent discharges to meet water quality standards in many local areas.

Several rivers, including the Lower Red, Sabine, Neches, Trinity, Brazos, Colorado, and Nueces Rivers can be used to support the water demands of the Texas Region. Even though the mean annual flow of these rivers (46.7 million acre-feet) is sufficient to meet the yearly 1985 water demand of 474 thousand acre-feet (high option 1985 withdrawal), as shown in Table 5-34, the 20-year monthly low flows would not be able to support the mean monthly water consumption (35,000 acre-feet) during four months of the year.

Increasing water consumption by up to 85 percent in 1990 would exacerbate the water deficit, though it will not increase the number of months with net water deficits. Tables in this analysis do not reflect water supplies derived from groundwater. The WRC estimates that groundwater reservoirs currently supply about 7.7 million acre-feet per year to the watersheds aggregated in Table 5-34. Baker and Wall [34] report that the three principal aquifers underlying the Texas Coal Region are the Sparta, Queen City, and Carrizo-Wilcox aquifers, and that these reservoirs could supply a steady-state yield of 130, 120, and 560 thousand acre-feet per year, respectively. (In some places, these formations overlap or are contained within the lignite deposits and may be locally removed or dewatered during surface mining.) The impact on surface water supplies from aquifer alteration and intensive use is therefore an important issue. Additionally, this region contains numerous large surface reservoirs which help distribute the water flows more evenly throughout the year. As with most surface mining projects, water quality impacts from sediment erosion will have to be addressed on a site by site basis.

The Yellowstone River Basin would provide water for the coal mining and processing facilities located in the Powder River Coal Region. Table 5-35 summarizes the impacts of the Powder River Coal Region requirements on the water supply in the Yellowstone River Basin. The high development option would require one percent of the average annual flow, and about two percent of the 20-year low annual flow of the Yellowstone River. Deficiencies are expected to occur during August and September at the 95 percent low-flow level. No additional months would experience net deficits due to coal development at any level, though existing deficits would be exacerbated. The monthly demand under this high option in 1985 would equal less than four percent of the unused regional flow in all months other than August and September. This demand would increase to five percent in 1990, assuming other water requirements remain constant.

Several additional constraints affect water availability in the Powder River Coal Region, some of which have implications affecting the other western regions as well. The Montana Water Use Act of 1973 amended the State of Montana water law structure to allow the designation of water reservation for maintenance of in-stream flow. In 1974, the State enacted "the Yellowstone Moratorium," suspending action on all applications for changes in beneficial use of existing water rights, as well as all applications for new water rights for the appropriation of more than 14 cfs or 14,000 acre-feet in the Yellowstone Basin.

The Moratorium was lifted upon the December 15, 1978 issuance of an "Order of Board of Natural Resources establishing Water Reservations." A principal result of the Order is the recognition that instream reservations for maintaining water quality and aquatic life are beneficial uses of water. The largest applications during the Moratorium under this category were submitted by the Montana Fish and Game Commission. The Order accepted portions of their applications. These included reservations of Yellowstone River water at Miles City and Sidney, Montana tied to the 80th percentile flow (minus other consumptive reservations). This category of flow is approxi-

mately equal to 5,578,900 and 5,492,300 acre feet per year at the respective locations. The reservations are less than the mean flow of the Yellowstone River, projected for 1985 and 2000 (see Appendix E). The reservations are greater than the 95% projected flow. However, as a result obtaining new water rights for coal mining and utilization facilities may be difficult. Insuring adequate supplies for drier years will likely foster competition between water users for older, established water rights. The December 15th Order also set down numerous other reservations which will affect available water supplies on a site-specific basis. Following the President's National Water Policy, water conservation in non-energy-related activities could make water available for energy users.

As mentioned previously, the Yellowtail Reservoir has a large, presently unused storage reserved for industrial uses [31]. Use of this water in the Powder River Coal Region would require pipelines or some other form of transport. The Montana Department of Natural Resources and Conservation has an application pending to increase the dam height on the Tongue River Reservoir (in eastern Big Horn County, in the middle of the coal region) to provide more storage for both irrigation and industry [36]. This application is also pending approval by the State Water Board. Approval of the full reservation would provide about 29,000 acre-feet per year for industrial use. This application conflicts in part with the application of the Montana Fish and Game Commission.

The Yellowstone River Compact of 1950 divided the waters of the Yellowstone River and its interstate tributaries (Clarks Fork, Big Horn River, Tongue River, and Powder River) between Montana and Wyoming. The compact applied only to those waters not appropriated at that time. Further, it contained a provision specifically prohibiting export of water from the basin without the unanimous consent of all signatory states, including North Dakota. Wyoming's share of this water could range from about 2.4 to 2.9 million acre-feet (mostly from the Big Horn Basin, which contains only marginal coal supplies), depending on the exact interpretation of the compact provisions. This compact could therefore affect the distribution of development within both the Powder River and Fort Union Coal Regions and could also affect the feasibility of coal slurry pipelines, though they might be more allowable if supplied by groundwater.

Groundwater is available in the Powder River Coal Region both from shallow aquifers (ranging in depth to several hundred feet) and from the deeper Madison aquifer system. The Madison has lately been the subject of much interest and is currently being studied by the U.S. Geological Survey [38] to determine its potential as a water source for coal development in the Powder River Basin. It has been estimated that large diameter wells drilled to depths of 1,000 to 5,000 feet and open to all aquifers through which they pass could yield up to 500 gpm [37]. However, available information is not sufficient to determine the ability of the shallow aquifers to support large well fields at this rate without causing excessive drawdowns and local depletions. In addition, the mixing of overlying aquifers could adversely affect both water levels (requiring deeper wells) and water quality. The inadvertent mixing of saline and fresh water aquifers is an issue of particular importance. Due to the low permeabilities of many bedrock aquifers, well fields producing significant amounts of groundwater would have to spread out over tens of square miles. Potential for high yield wells does exist in some areas of secondary porosity, where partings or small faults induced in the rock strata provide paths along which the water could move with less resistance. Wells placed to take advantage of these underground patterns might produce quite high sustained yields. These concepts are presently being tested by the U.S. Geological Survey [38]. Even so, it is possible that withdrawal rates on the order of 20,000 acre-feet per year from one well field would greatly exceed the rate at which groundwater is recharged. An overall loss in the resource would then occur. Land subsidence might also develop at depths which could hinder aquifer recharge and recovery.

Excessive groundwater withdrawals and consumption may also affect the flow of surface water bodies and springs which are supported by groundwater discharge. During times of low surface water flow, groundwater may be the primary water source. Disruption of aquifers may therefore cause ecologic as well as water supply impacts. While this condition is obviously a concern for shallow aquifers, modifications to deeper groundwater zones could foster adverse

surface water impacts at considerable distances from the point of groundwater use.

The Fort Union Coal Region has the advantage of being able to draw on the supplies of the upper mainstem of the Missouri River as well as water from the Yellowstone River system. Also, two large reservoirs, Fort Peck Lake and Lake Sakakawea, located on the Missouri River have combined active storage in excess of 24 million acre-feet [37] and can help distribute the water flow more evenly through time, saving the peak flows for release during dry periods. With proper planning, the reservoirs of the region would be able to reduce or prevent low-flow problems in the future. The aquatic life of the reservoirs could be affected during irregular fluctuations of the water level. Comparison of Table 5-20 with Table 5-13 shows that even at the high production level less than four percent of the annual 20-year low flow is required. The average monthly requirement for the high option (about 15 thousand acre-feet) amounts to 10.5 percent of the lowest monthly low flow (February). As previously discussed, these calculations apply only to the net water balance in the basin. Shortages could occur locally that would not be reflected by the stream flows out of the basin. Additionally, water rights and other legal considerations could affect actual water availability.

The Upper Colorado River Basin would be the primary source of supply for the Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan River Coal Regions. The supply and demand estimates for this basin are summarized in Table 5-37. This basin along with several others in the western states has been extensively studied from both water quantity and quality standpoints. Significant contributions to resource knowledge emerged from Federal and state efforts in the Water for Energy Management Program [26,37]. Numerous laws and agreements are of particular importance to the Colorado River Basin. According to the Colorado River Compact of 1922, the states of the Upper Colorado River Basin must supply an average flow over any consecutive 10-year period of 7.5 million acre-feet per year to the Lower Basin at Lee's Ferry, Arizona. In addition, the states are obligated to support the U.S. agreement to release 1.5 million acre-feet per year to Mexico, though the exact extent of their obligation is a point of dispute between the states in the Upper and Lower Basins. Assuming the Upper Basin states contribute one half of the water for Mexico (a maximum case), they would be required to release a mean flow of 8.25 million acre-feet per year to the Lower Basin. The estimated mean total stream flow for the Upper Basin is 13.93 million acre-feet per year (including evaporation, see Appendix E). Therefore, the amount of water available for use in the Upper Basin averages at most 5.68 million acre-feet per year. The estimated consumptive requirement in the basin by the year 2000 is nearly four million acre-feet. Based on a supply of 5.7 million acre-feet, a maximum of approximately 1.7 million acre-feet would remain for additional development.

Meeting required releases to the Lower Colorado Basin may be difficult during low flow conditions, due to excessive demand and limited supplies. According to Table 5-37, projected demands would exceed supply for three months and be only marginally below demand for an additional two months.

Several large reservoirs and numerous smaller ones are currently in operation in the Upper Colorado Basin. The Flaming Gorge Reservoir is located in the Green River-Hams Fork Coal Region and its releases affect stream flow in the northern portion of the Uinta-Southwestern Utah Coal Region. Its active storage is about 3.7 million acre-feet. The Blue Mesa Reservoir, just east of the Uinta-Southwestern Utah Coal Region, has an active storage of 830,000 acre-feet. The San Juan River Coal Region contains the Navajo Reservoir, with an active storage of about 1.7 million acre-feet, much of which is committed to a Navajo Indian irrigation project [39]. Under appropriate circumstances, some of the water demands for coal development could be supplied from these reservoirs, even though they distribute flows only and, due to evaporation, could decrease the total water supply.

Groundwater is available in the Upper Colorado Basin (Green River-Hams Fork and Uinta-Southwestern Utah Coal Regions), though not to the extent it is in the Eastern Interior and Appalachian Coal Regions. It has been estimated that the Upper Colorado Basin contains between 50 and 115 million acre-feet of recoverable groundwater in storage in the upper 100 feet of saturated rocks. The cost of pumping deeper aquifers and mitigating such potential impacts as subsidence may be considerable, however. Rec-

harge rates are believed to be about four million acre-feet per year [40]. Any long-term diversion of groundwater, over and above natural recharge, could cause a proportionate decrease in the groundwater influx to streams. In addition, although the total volume of groundwater in storage is rather large, about 85 percent of it occurs in sedimentary rocks characterized by low permeability which yield water to wells quite slowly. Well yields in the vicinity of the San Juan River Coal Region rarely exceed 50 gallons per minute. In places, especially around the San Juan River Coal Region, groundwater levels may be more than 1,000 feet below the land surface [40]. Indian claims to groundwater in the San Juan River Coal Region have already been noted. No final determinations have been made as to who owns the water underlying much of this coal. Disposition of the issue will critically affect the development of the coal in the San Juan River Region. In some areas of Arizona and New Mexico, notably near urban areas south of the San Juan River Coal Region (such as Phoenix and Tucson, Arizona), groundwater withdrawals are causing large drawdowns of the water table. It is estimated that the groundwater overdraft in Arizona is about two million acre-feet per year [41]. Such overdrafts can lead to land subsidence as the pore spaces in the rock which were formerly filled with water collapse. It may be concluded that, although groundwater supplies may be sufficient to support individual plants, depending on their location, groundwater reservoirs are not in themselves sufficient to supply the additional water to support the commitment to the Lower Basin.

The 1985 discharge of about 25,000 acre-feet of effluent from the Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan River Coal Regions in the Colorado River Basin may result in regional as well as local water quality impacts. The Colorado River Basin is already characterized by high salinity. To minimize the deleterious impacts on the Colorado River of saline drainage waters resulting from operation of mines and coal-using facilities, these facilities should operate in accordance with the policy, adopted by the seven-state Colorado River Basin Salinity Control Forum and the states of the Colorado River Basin, of no-salt returns in industrial discharges, wherever practicable. This policy has been followed by the states and the Environmental Protection Agency in the issuance of National Pollution Discharge Elimination System permits in the Colorado River Basin. Adherence to this policy will minimize the salinity deterioration below Hoover Dam.

The water requirements for the Green River-Hams Fork and Uinta-Southwestern Utah Coal Regions can also be examined based on smaller sub-basins contained within the Upper Colorado River Basin. The Green River-Hams Fork Coal Region is contained entirely within the Green River Basin (ASR 1401). The Uinta-Southwestern Utah Coal Region spans the lower part of the Green River Basin, as well as a large fraction of the Upper Colorado River Mainstem (ASR 1402). Table 5-38 compares water supply data for the Green River with the water requirements for coal development in the Green River-Hams Fork Coal Region alone.

Table 5-38 summarizes the impact of coal development in the Green River-Hams Fork Coal Region on the predicted water flow in the Green River Basin. Coal development in this region would require up to 61 thousand acre-feet of water annually by 1985, and 63 thousand acre-feet annually by 1990. Even at the high option, this is less than two percent of the mean annual water flow and less than four percent of the 20-year low flow in the Green River. On a monthly low-flow basis, it is estimated that water demand during one month (August) would exceed supply by the year 1985 even without coal development. No additional months would experience net deficits as a result of coal development at any of the options presented here, and except for that one month, the high option water consumption would be less than 15 percent of the unused stream flow during any monthly low flow.

Table 5-39 compares the combined supply data for the Green and Upper Colorado Mainstem Systems with the requirements for coal development in both the Green River-Hams Fork and the Unita-Southwestern Utah Coal Regions. The extent to which these sub-basins would be required to support the Colorado River Compact and associated commitments is not clear. Although the water in the Upper Basin as a whole is divided between the states, it is not divided according to watershed, so neither coal region's share of the commitment can readily be estimated. However, the total mean annual stream flow of the Green River alone (as shown in Appendix E) constitutes

38 percent of the total flow in the Upper Basin, and the combined flows of the Upper Colorado Mainstem and Green River constitute 84 percent of the total mean flow of the Upper Colorado River at Lee's Ferry, Arizona. It can therefore be assumed that the Green River-Hams Fork and Uinta-Southwestern Utah Coal Regions' share of Upper Basin commitments are significant. In addition, the water rights to most free-flowing water in the Upper Colorado Basin are already allocated and could have to be transferred in order to support additional development with assured water supplies. As discussed for the other regions, future minimum flow requirements for insuring fish and wildlife productivity may add other surface water supply constraints.

Table 5-39 summarizes the impact of coal development in both the Unita-Southwestern Utah and Green River-Hams Fork Coal Regions on the projected combined waterflows in the Upper Colorado Mainstem and Green River. Coal development in both of the aforementioned regions would require up to 120 thousand acre-feet of water each year by 1985, and up to 127 thousand acre-feet by 1990. At the high option level, this is about 1.3 and 3.0 percent of the mean and 20-year low annual flows (respectively) of the combined river systems. Even on a monthly low-flow basis, it is estimated that the water flow in the basin would be sufficient to supply the water requirements for both coal development and all other users by drawing heavily on the Upper Colorado Mainstem during periods of drought. Coal development would require up to about 7.5 percent of the lowest 20-year monthly flow in 1985.

However, in order to obtain sufficient and reliable water supplies to support normal regional development, the compact commitments, and coal developments in the Upper Colorado Basin, it would probably be necessary to obtain existing water rights and transfer them to industrial purposes. Such procedures would be significantly affected by the disposition of existing and future court cases involving the extent of Indian and Federal water rights. The ability to acquire and transfer existing water rights is governed by state law and varies with each state in the region. Although such transfers may be somewhat complicated, they are generally possible in all the Upper Basin states [30]. Such transfers would decrease the amount of water used for other purposes, notably irrigation, and could have considerable socioeconomic impacts.

The Upper Platte and Upper Arkansas River Basins would be the source of water supply for future development in the Denver-Raton Mesa Coal Region. Coal development at the high option level would require 65 and 79 thousand acre-feet of water per year in 1985 and 1990, respectively. Table 5-40 indicates that even without additional demands for coal development, the projected monthly mean flow during July and August would not meet the normal water requirements of the two basins. At the low flow level, net deficiencies would occur during September as well, and local deficiencies would probably occur during other months. With limited available stream flow for assimilation, point source discharges from coal utilization facilities and non-point pollution from coal mining operations may develop as important water quality constraints.

The water shortages of this region are compounded by its rapid rate of urbanization. In a situation similar to that discussed for the Upper Colorado and Upper Missouri River Basins, virtually all dependable natural water supplies of the region were claimed long ago under the doctrine of prior appropriation [42]. Rapid urbanization on the eastern slopes of the front range of the Rocky Mountains has resulted in intense competition for existing water rights and has led to several condemnation proceedings being brought against irrigation companies to secure agricultural water rights for municipal use [43]. The prospects of developing new water rights for coal development in the prevailing political climate of this region are not good.

Impacts of Other Alternatives. Table 5-41 presents the relative water consumption of the other alternatives, as compared to the no new leasing alternative. The information is presented in acre-feet per year, and aggregated in the same watersheds used in the preceding analysis. In order to compare these estimates with the expected water flows in Tables 5-31 through 5-40, the numbers must be divided by 12 to yield monthly consumption. Even considering the annual values, most of the differences are small, and many are almost negligible.

Preferred Program. In 1985, the consumptive water requirements for the low option of the

TABLE 5-41

WATER CONSUMPTION (EVAPORATIVE)
IMPACTS, COMPARISON OF ALTERNATIVES

(1000 ac-ft/yr)

WATERSHED	Program Alternatives										
	NO NEW LEASING(a)			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985 PROJECTIONS										
Upper Ohio & Upper Tenn.	826.4	919.7	927.4	0	-7.2	-1.8	-21.7	-22.7	-24.0	0	-22.9
Upper Miss. & Ohio Rivers	1,238.4	1,349.0	1,380.4	0	-7.9	0.2	-22.0	-23.8	-22.9	0	-25.4
Missouri & Arkansas Rivers	418.6	499.2	591.8	6.6	-3.3	28.8	-8.2	-6.7	-14.3	0	-21.4
Texas Gulf & Red River	277.4	421.4	424.4	0.3	1.9	18.4	-3.4	-1.8	-6.3	0	9.5
Yellowstone River	60.1	63.3	73.8	0	0	2.4	-0.02	0.02	2.6	0	-2.2
Upper Missouri River	114.5	110.6	175.4	6.6	7.1	3.4	7.1	7.2	16.8	0	9.2
Green River	49.3	59.5	60.7	0	1.7	2.8	-0.4	0.2	5.2	0	0.4
Green River & Upper Colo.	101.8	112.8	119.8	0	3.2	3.9	0.2	0.8	7.4	0	0.04
Upper Colo. at Lee's Ferry	129.3	141.9	165.9	0	3.2	3.8	0.4	-0.6	7.6	0	0.4
Upper Platte & Upper Ark.	46.7	58.3	65.4	0	2.9	1.4	2.7	2.7	5.7	0	-0.4
	1990 PROJECTIONS										
Upper Ohio & Upper Tenn.	807.7	1,118.8	1,150.8	8.4	0.3	422.1	15.7	-2.2	3.7	-1.0	7.6
Upper Miss. & Ohio Rivers	1,327.9	1,596.9	1,609.3	8.9	-0.3	544.4	15.5	-5.7	3.6	-0.3	5.1
Missouri & Arkansas Rivers	511.3	821.9	836.5	0.9	4.6	112.4	-13.9	-11.0	32.7	3.5	-35.6
Texas Gulf & Red River	354.6	775.3	753.1	-1.0	-1.6	73.0	-12.6	-10.7	-13.7	-5.8	-10.6
Yellowstone River	82.3	76.6	96.0	0.3	5.6	15.8	2.6	-0.4	9.4	5.4	-4.1
Upper Missouri River	164.5	198.1	231.9	0.3	5.0	9.9	4.7	2.9	17.9	-10.6	0.7
Green River	58.9	55.5	62.6	0.5	1.4	5.9	-4.0	-4.2	4.4	2.9	-6.3
Green River & Upper Colo.	127.0	118.0	126.8	2.3	1.5	27.2	-7.4	-7.1	5.5	2.4	-8.9
Upper Colo. at Lee's Ferry	161.2	153.6	173.1	2.9	1.2	62.0	-7.6	-7.5	5.6	-4.1	-9.4
Upper Platte & Upper Ark.	68.0	87.9	79.2	0	0	21.6	-2.1	-1.6	2.4	2.6	-6.3

(a) Represents absolute water consumption under the no new leasing alternative production projections. All other columns represent changes from the no new leasing base case. Refers to coal-related activities only.

preferred program are practically indistinguishable from those of the low option of the no new leasing alternative. The only difference is an additional demand for about 550 acre-feet per month in the Fort Union Coal Region. This could result in a slight increase in local shortages in that region during times of drought. However, due to the large reservoir storage capacity in the region, the significance of this increased demand is minor.

Similarly, all other options for this alternative in both 1985 and 1990 would not greatly increase the water demands over those discussed with respect to the no new leasing alternative. Except for a few regions in the case of the 1990 high option, consumptive water demands would not increase more than 2,000 acre-feet per month.

In 1990 the high option for the preferred program would increase the consumptive water demand in the Mississippi, Ohio, and Tennessee River Basins by a total of 544 thousand acre-feet per year. This increased demand can be supplied relatively easily in the Appalachian, Eastern Interior, and Western Interior Coal Regions, although the associated effluents could somewhat decrease local water quality. The increased demand of about 10,000 acre-feet per month in the Western Interior Coal Region for this option represents a 13 percent increase over the no new leasing alternative, and could exacerbate the supply problems in that region accordingly. Similarly, the 36 percent increase projected for the coal regions of the Upper Colorado River Basin (Green River-Hams Fork and Uinta-Southwestern Utah) would serve to increase competition for water. Although, subject to the constraints discussed previously, this increase could be met on an annual basis without violating any of the regional water compacts. Local shortages would probably be an important constraint on this option.

PRLAs Only Alternative. In 1985, the water requirements for this alternative would decrease water consumption by less than as 2,000 acre-feet per month (relative to the no new leasing alternative) in any of the watersheds addressed in this analysis. In 1990, relative water consumption would change by as much as 1,000 acre-feet per month in four of the watersheds addressed in this analysis. The effects of this alternative would, therefore, closely parallel those discussed for the no new leasing alternative.

Emergency Leasing Only Alternative. The 1985 consumptive water requirements for this alternative are nearly identical to those of the PRLAs only alternative. The 1990 water consumption would decrease relative to the no new leasing alternative in all but one watershed (Upper Missouri River) by less than 1,000 acre-feet per month. This alternative thus represents a slight improvement in most watersheds relative to the impacts described previously for the no new leasing alternative. However, due to the small differences, the improvements would be minor.

Meet Industry Needs Alternative. The net effect of this alternative would be to slightly increase western water consumption (relative to the no new leasing alternative) in both 1985 and 1990. The maximum increase would be 3,000 acre-feet per month in the Missouri and Arkansas River Basins (Western Interior, Denver-Raton-Mesa and Uinta-Southwestern Utah Coal Regions). Water demand in the East would be less than that of the no new leasing alternative in 1985, and greater in 1990. Water shortages and pollution problems in the West would be slightly increased by this alternative, relative to those discussed previously.

Meet DOE Goals Alternative. The 1985 water demands for this alternative are identical to those of the no new leasing alternative. The 1990 demands differ by less than 500 acre-feet per month in all watersheds except the Upper Missouri (Western Interior Coal Region), which decreases by about 900 acre-feet per month. Thus, the impacts of this alternative would be very close to those of the no new leasing alternative. Shortages would be somewhat exacerbated in the Yellowstone, Green, Upper Colorado Mainstem, Upper Platte, and Upper Arkansas River Basins in 1990.

State Determination of Leasing Levels Alternative. The results of this alternative would be to decrease 1985 water consumption in the Appalachian, and Eastern and Western Interior Coal Regions, and increase consumption in the Fort Union and Texas Coal Regions, relative to the no new leasing alternative. Changes in these regions would be less than 2,000 acre-feet per month, while consumption in other regions would be changed by less than 2,000 acre-feet per year. The 1990 demands for this alternative would be slightly greater than those of the no new leasing alternative

in the Appalachian and Fort Union Coal Regions, and less in all others. The reservoirs of the Texas and Fort Union Coal Regions should be sufficient to supply the additional demands in both years, though local shortages may occur. More extensive aquifer disruption in these regions may create additional problems. Otherwise, the impacts of this alternative would be similar to those discussed previously. The water availability problems projected for the Western Interior Coal Region, and to a lesser extent in the Denver-Raton Mesa Coal Region, would be somewhat reduced.

5.3.2.7 Air Quality. This section addresses air emissions so as to compare the region by region totals, as well as the emissions associated with the Federal coal management program alternatives against the no new leasing base case. This section begins with a discussion of the sources of air emissions associated with the entire coal development cycle. Next, the legislative status of the control of air emissions is addressed. Finally, the data associated with total emissions for each coal region and for each alternative is presented and discussed.

The regional emissions for each alternative represent the aggregated emissions from coal mining, transportation, and conversion and utilization. Gaseous streams, composed primarily of carbon dioxide (CO_2), oxides of sulfur (SO_2), oxides of nitrogen (NOx), and particulate matter, would be emitted to the environment because of coal development even though best available emission control technologies (BACT) were employed and air quality standards were enforced. Hydrocarbons (HC), carbon monoxide (CO), and trace elements are also emitted, although in smaller quantities. Coal conversion and utilization would contribute the largest single amount to the totals; however, significant amounts of particulates would be emitted by coal mining.

The aggregated emissions do not directly represent measures of air quality degradation. The quality of the air is measured by the concentration of pollutants in the atmosphere, typically expressed in micrograms per cubic meter (ug/m^3). Models of varying degrees of sophistication are available that convert, under specified circumstances, the point or area source emissions into estimates of ambient air concentrations. The use of these models requires detailed information regarding the nature of the source as well as meteorological and geographic characteristics of the surrounding area. The alternatives for a Federal coal management program cannot be compared on the basis of ambient concentrations because there is not enough specific data available from which to make the model calculations. A comparison of the total emissions for each alternative is the most meaningful measure of relative air quality impact available.

Potential Air Quality Impacts. In estimating the total dust emissions from a coal mine, it is preferable to identify the dust-producing activities present and estimate emissions from each activity separately rather than to use a single emission factor for the entire mine. This allows direct determination of the major emission sources and their contribution to the overall emissions from the mine.

Potential sources of dust associated with coal mines are as follows:

- Haul roads.
- Access roads.
- Topsoil removal.
- Overburden removal.
- Reclamation.
- Drilling.
- Blasting.
- Shovel/truck loading.
- Transfer and conveying.
- Front-end loading.
- Truck dumping.
- Open storage.
- Coal crushing (after truck dumping).
- Coal cleaning.
- Train loading.
- Waste disposal.
- Fly-ash dump at mine mouth plants.
- Coal fires.
- Wind erosion of exposed areas.

These sources are not always noticeable at every mine site. For example, only the transfer, conveying, and access road sources are normally found at underground mines. Recent studies have shown that of the sources listed above, haul roads and access roads are most often the largest contributors to ambient particulate concentrations at and near the mine sites [44]. Other major sources of particulates are wind erosion from exposed areas and topsoil and overburden removal.

The impact of mining operations on existing particulate air quality at and in the vicinity of an active mine would depend on a number of variables: climatology, type of dust-producing operations, and size of the mine. Any one of these factors could greatly add to or reduce emissions from a mine site. For example, a small underground mine could contribute greatly to the ambient particulate concentration in the surrounding area because of an extremely long unpaved access road leading to the mine which mine employees travel every day.

The impacts on air quality would be greatest at the mine site where generation of airborne particulates would take place and at areas closely surrounding the mine site. Air quality impacts from mining operations generally would decrease markedly with respect to distance from the site.

The addition of particulates to the atmosphere could also reduce visibility at the mine site and in surrounding areas. Table 5-42 presents four examples of visibility reduction that could happen as a result of increased atmospheric total suspended particulates.

Another air pollution source at coal mines is exhaust emissions from employees' motor vehicles and diesel-powered haul trucks and equipment. The major gaseous emissions from these sources are carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and water vapor. The amount of these pollutants generated at even the larger coal mines would not be significant, as indicated by recent studies of the impact of vehicle emissions associated with western coal mines. [16].

Air pollutants associated with transportation of coal by rail or barge would result primarily from coal cars and barges and from the exhaust of train and tug engines. Estimates of wind blown coal dust range from 0.2 to two percent of the volume of coal transported [2]. These estimates assume that the coal is transported dry. If transported wet, dust emissions could be reduced to negligible amounts.

Any large-scale construction activity would generate essentially the same types of air pollutants. The major emissions would include fugitive dust, exhausts from motor vehicles and construction equipment (primarily carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and water vapor), and smoke from the burning of cleared vegetation. The magnitude of the emissions would depend on the size of the construction area, the method of construction, the project duration, the type of terrain, and the type of control measures employed. In low areas in narrow, steep-sided valleys, where the build-up of polluted air would be greater than in surrounding areas, concentrations of nitrogen oxides from construction equipment could exceed the National Ambient Air Quality Secondary Standards. The actual concentrations would depend upon such factors as wind and temperature conditions, atmospheric mixing conditions, pollutant production rates, and duration of operations.

Coal combustion to generate steam and electric power for internal use by synthetic fuel plants and electric power plants would release both gaseous and solid (particulate matter) pollutants. The chemical and physical characteristics of the gases leaving the boiler primarily are a function of the fuel composition and boiler design. The major gaseous pollutants produced during fossil fuel combustion would be sulfur oxides, nitrogen oxides, carbon monoxide, hydrocarbons, and aldehydes. The particulate matter produced during combustion would leave the boiler as fly ash.

Sulfur oxides would be produced in the greatest quantity during coal combustion. About 95 percent of the sulfur in the coal would be converted to gaseous sulfur oxides; the balance would remain in the fly and bottom ash, or slag. The weight of the sulfur dioxide is essentially twice the weight of the sulfur in the gas. For coal with a sulfur content of two percent (by weight), approximately 76 pounds of sulfur dioxide would be produced for each ton of coal combusted.

Nitrogen oxides are produced from high temperature reactions of nitrogen and oxygen present in the combustion atmosphere and the combustion of nitrogen-containing compounds in the fuel. The concentration of nitrogen oxides in the exhaust during coal combustion would be affected by the amount of nitrogen in the coal, the air-to-fuel ratio, and the way the temperature of the combustion gases changes with time as the gases pass through the boiler. Dry bottom pulverized coal-fired units would emit about 18 pounds of nitrogen oxides for each ton of coal fired, wet bottom pulverized coal units (operating at higher temperatures) would emit 30 pounds, and wet bottom cyclone units would emit 55 pounds [45].

Presently there are no national primary or secondary standards or new source performance

TABLE 5-42

EXPECTED VISIBILITY AT FOUR DIFFERENT TOTAL SUSPENDED PARTICULATE CONCENTRATIONS(a)

EXAMPLE	BACKGROUND(b) TSP CONCENTRATION ($\mu g/m^3$)	BACKGROUND(c) VISIBILITY (miles)	ADDITIONAL(d) PARTICULATES FROM THE MINE ($\mu g/m^3$)	RESULTANT(e) AMBIENT CONCENTRATION ($\mu g/m^3$)	RESULTANT(f) VISIBILITY (miles)	REDUCTION(g) IN AVERAGE VISIBILITY (miles)
1	25	45	5	30	40	5
2	25	45	15	40	32	13
3	25	45	30	55	25	20
4	25	45	60	85	18	27

(a) Expected visibility for the hypothetical situations presented in this table were calculated from the formula presented in Reference Number 77.

(b) Represents a hypothetical annual average ambient particulate concentration that would exist without the mining activity.

(c) Represents a hypothetical annual average visibility that would exist without the mining activity.

(d) That additional portion of the ambient particulate concentration that would be contributed to the TSP as a result of mining activity. Note that the higher contributions such as, 60 and 30 $\mu g/m^3$, would normally occur in very close proximity to the mine site.

(e) The TSP concentration that would result from the background concentration plus the contribution from the mining activity.

(f) The average visibility that would result from the resultant ambient concentration.

(g) The reduction in visibility that is directly attributable to the additional particulates from the mining activity.

standards for carbon dioxide. In fact, general practice currently is to convert pollutants such as HC and CO to CO_2 and H_2O and discharge them to the atmosphere. However, there are indications that the rising CO_2 levels in the atmosphere could pose a serious problem, commonly referred to as the greenhouse effect[1]. Therefore, CO_2 is addressed here as a potential pollutant.

Carbon dioxide is produced from complete combustion of carbon or carbon-containing compounds. During coal production, CO_2 is generated from the burning of coal at the mine site for power as in well as in the combustion of diesel fuel needed to run mining equipment. During the cleaning of coal, CO_2 is emitted from thermal dryers, while, during transportation, CO_2 is emitted from the combustion of liquid fuel used by the transportation facility. Finally, coal conversion and combustion would result in large quantities of CO_2 emissions. The combustion of one ton of carbon would produce about 3.67 tons of CO_2 . The National Research Council [112] concluded that the primary limit on energy production from fossil fuels during the next few centuries may be the climatic effects associated with the release of carbon dioxide. Generally there are uncertainties about the carbon cycle, the net sources of carbon dioxide in the atmosphere, and the net effects of carbon dioxide on temperature and climate. Generally, about 40 percent of the carbon dioxide released to the air is absorbed by the land organic pool, about 20 percent is absorbed by the oceans, and about 40 percent remains in the air. Some experts feel that a doubling of carbon dioxide in the atmosphere will cause about a 2° to 3° C rise in the average temperature of the lower atmosphere at middle latitudes.

Other gaseous pollutants such as carbon monoxide, hydrocarbons, and aldehydes would occur in relatively small quantities during fuel combustion. They would result from incomplete combustion of the organic portion of the coal. Careful control of excess air rates, the use of high combustion temperature, and provisions for more complete fuel-air contact could minimize these emissions.

The particulates in the exhaust gases of coal combustion would be composed primarily of silica, alumina, and iron present in the inorganic portion of the coal or ash. The size distribution of particles leaving the unit would primarily be a function of unit type. Particulates from a pulverized coal unit would generally be larger than those from a cyclone unit. Particle size distribution would vary from one boiler to the next. These variations are important as they affect the formation of fine particulates that are not only more difficult to control but also considered a greater risk to health.

In addition to the major gaseous and particulate pollutants of concern, coal combustion would also result in emissions of a variety of toxic trace elements which, in sufficient quantity, could cause adverse environmental and health effects. During combustion, these trace elements could vaporize to exit the boiler in a gaseous state, or they could form particulates that would be entrained in the exhaust. High efficiency particulate control could greatly reduce these emissions. However, despite the low concentrations of these pollutants in coal and the high efficiency of present particulate control systems, the sheer volume of coal consumed in the United States makes coal combustion a major air emission source of these pollutants.

The Environmental Protection Agency [45] has estimated the average trace element emissions associated with coal combustion in domestic utility boilers. These estimates and the assumed emission factors are presented in Table 5-43. The atmospheric concentration of each element is shown in parts per million (ppm) whereas the emission factor is expresed as grams per million Btu consumed. (Approximately 453 grams equal one pound).

Coal also contains traces of uranium, thorium, and radium; consequently, during combustion, low levels of radionuclides would be emitted from coal-burning facilities. Studies of radioactive releases from 1,000-megawatt electric power plants employing eastern coals have indicated that the observed levels of radioactive releases did not

[1]Carbon dioxide, although transparent to shortwave solar radiation (visible light), strongly absorbs the earth's long-wave radiation (heat) at certain wavelengths. Carbon dioxide molecules absorb infrared radiation emitted by the earth's surface that otherwise would excape into space. Just as glass in a greenhouse traps the sun's heat, so also CO_2 absorbs heat (the long-wave radiation from the earth's surface) and produces what is known as the greenhouse effect. Thus, high levels of carbon dioxide could upset the balance of incoming solar radiation and outgoing heat from the earth causing a net increase in temperature on the earth's surface. This increase may cause climatic changes.

TABLE 5-43

TRACE ELEMENTS AND EMISSIONS FROM FOSSIL FUELS

ELEMENT	COAL		OIL	
	CONCENTRATION (ppm)	EMISSION FACTOR ($g/10^6$ Btu) (a)	CONCENTRATION (ppm)	EMISSION FACTOR ($g/10^6$ Btu) (b)
Antimony	5.0	0.20	<0.024	0.0059
Arsenic	32.0	1.3	<0.08	0.002
Barium	500.0	20.2	<0.11	0.003
Beryllium	2.44	0.099		
Boron	61.0	2.47		
Cadmium	0.03	0.001		
Chlorine	160.0	6.48		
Chromium	15.4	0.624		
Cobalt	4.8	0.194		
Copper	13.5	0.547		
Fluorine	82.0	3.32		
Lead	9.5	0.38		
Manganese	50.0	2.02	<0.04	0.001
Mercury	0.15	0.0061		
Nickel	14.8	0.599	16	0.39
Selenium	2.2	0.089		
Tellurium	1.0	0.04		
Thallium	0.3	0.01		
Tin	0.9	0.036	<0.8	0.02
Titanium	385.0	15.6		
Vanadium	26.4	1.07	9.0	0.22
Zinc	12.0	0.49		

(a) Based on heating value of 11,200 Btu/lb for coal as burned.
(b) Based on heating value of 18,400 Btu/lb for residual oil as burned.

Source: Reference Number 45.

constitute a public health problem [46,47]. It is not known how radioactive releases from coal gasification or liquefaction plants would compare with those from fossil fuel power plants. Futhermore, a recent Environmental Protection Agency study has indicated that the lung dose from a 1,000-megawatt electric power plant employing western coal could be significant (see U.S. Environmental Protection Agency comments in Appendix E of Reference 39).

In general, because of the dispersion of coal combustion throughout the United States, air concentrations of trace elements from coal firing should not accumulate to levels likely to be associated with known adverse health effects. However, the long-term health effects of these emissions and their overall impact on the environment have not been well defined.

Emission Control Standards. Application of fugitive-dust control measures as required by OSM's proposed regulations will contribute to the achievement and maintenance of National Ambient Air Quality Standards and other applicable Federal and state air quality standards. Production facilities using fossil-fuel steam generators must meet Environmental Protection Agency (EPA) new source performance standards (NSPS). The baseline regulation is summarized in Table 5-44. The Clean Air Act Amendments of 1977 require EPA to revise the current standards of performance for fossil fuel-fired stationary sources. The intended effect of recent EPA proposed standards is to require new, modified, and reconstructed electric utility steam generating units to use the best demonstrated systems of continuous emission reduction and to satisfy the requirements of the Clean Air Act Amendments of 1977.

The principal issue associated with the proposed standards is whether electric utility steam generating units firing low-sulfur coal should be required to achieve the same percentage reduction in potential sulfur dioxide emissions as those burning higher sulfur content coal. Resolving this question of full versus partial control is difficult because of the significant environmental, energy, and economic implications associated with each alternative. The Administrator of EPA has not made a decision on which of the alternatives should be adopted in the final standard.

The proposed standards would apply to electric utility steam generating units that are capable of firing more than 73 megawatts (250 million Btu/hour heat input of fossil fuel) and for which construction is commenced after September 18, 1978.

The proposed sulfur dioxide (SO_2) standards would limit emissions to 1.2 lb/million Btu heat input for solid fuel (except for three days per month) and 0.80 lb/million Btu for liquid and gaseous fuel (except for three days per month). Also, uncontrolled SO_2 emissions from solid, liquid, and gaseous fuel would be required to be reduced by 85 percent regardless of the sulfur content of the fuel burned. Credit would be given, however, for sulfur removed in fuel pretreatment or removed in bottom ash. The percent reduction requirement would not apply if SO_2 emissions into the atmosphere would be less than 0.20 lb/million Btu heat input without pollution controls.

The proposed particulate matter emission standard would limit emissions to 0.03 lb/million Btu heat input. The proposed opacity standard would limit the opacity of emissions to 20 percent (six-minute average).

The proposed NO_2 emission standards vary according to fuel characteristics as follows:

- 0.50 lb/million Btu heat input from the combustion of subbituminous coal, shale oil, or any solid, liquid, or gaseous fuel derived from coal.
- 0.60 lb/million Btu heat input from the combustion of bituminous coal.

Several states within the coal regions have promulgated sulfur oxide and particulate emissions limitations for the combustion of coal that are stricter than the proposed Federal standards. The stricter standards are noted in Table 5-45.

Under the Clean Air Act of 1970, EPA was directed to establish National Ambient Air Quality Standards (NAAQS) to protect public health (primary standards) and public welfare (secondary standards). As of October 1978, EPA has established NAAQS for specified pollutants at particular levels determined by what are termed "episode criteria." These pollutants are known as criteria pollutants and are sulfur oxides, particulates, carbon monoxide, photochemical oxidants, nitrogen oxides, and hydrocarbons. The NAAQS and the recommended Federal episode criteria established by the EPA are given in Table 5-46.

TABLE 5-44

SELECTED NEW SOURCE PERFORMANCE STANDARDS (NSPS)
FOR AIR POLLUTANT SOURCES

SOURCE	POLLUTANT	EMISSIONS NOT TO EXCEED
Fossil-Fuel Steam Generators	Particulate Matter	0.10 lb/10^6 Btu input
(≥250 x 10^6 Btu/hr input)	Opacity	20 percent Opacity except for one two-minute period per hour of not more than 40 percent Opacity
	Oxides of Sulfur (as SO_2)	1.2 lb/10^6 Btu input (solid fuel)
		0.8 lbs/10^6 Btu input (liquid fuel)
	Nitrogen Oxides (as NO_2)	0.70 lb/10^6 Btu input (solid fuel except lignite or fuel containing more than 25 percent by weight of coal refuse)
		0.20 lb/10^6 Btu input (gaseous fuel)
		0.30 lb/10^6 Btu input (liquid fuel)

Source: 40 CFR 60.40

TABLE 5-45

STATE NEW SOURCE PERFORMANCE STANDARDS

FOR COAL COMBUSTION

STATE	TSP (lbs/MM Btu)	SO_x (lbs/MM Btu)	NO_x (lbs/MM Btu)
Arizona	*	0.8[a]	*
Colorado	*	5 tons/day[b]	*
New Mexico	0.05; 0.02 fine	0.34[c]	0.45[c]
Pennsylvania	*	0.6[d]	*
Wyoming	*	0.2[e]	*
Ohio	*	1.0[f]	*

*Equal to or less stringent than Federal NSPS.

Sources:

(a) Reference Number 78.

(b) Reference Number 79.

(c) Reference Number 80, for some areas.

(d) Reference Number 81, for Southeast Pennsylvania air basin inner zone (general provisions only).

(e) Reference Number 82.

(f) Reference Number 83, for fuel with sulfur content 1%.

Note: State New Source Performance Standards are more complex. For more details, see references.

TABLE 5-46

NATIONAL AMBIENT AIR QUALITY STANDARDS
AND RECOMMENDED FEDERAL EPISODE CRITERIA
(at 25°C and 760 mm pressure)

POLLUTANTS UNITS AVERAGING TIME(a)	SECONDARY(b)	PRIMARY(c)	ALERT(d)	WARNING(d)	EMERGENCY(d)	SIGNIFICANT HARM
Sulfur dioxide						
$\mu g/m^3$						
1 year		80				
24 hours(e)		365	800	1,600	2,100	2,620
3 hours(e)	1,300					
Particulate Matter						
$\mu g/m^3$						
1 year	60	75				
24 hours(e)	150	260	375	625	875	1,000
Product of Sulfur dioxide and Particulate Matter						
$[\mu g/m^3]^2$			6.5×10^4	2.61×10^5	3.93×10^5	
Carbon monoxide						
mg/m^3						
8 hours(e)	10	10	17	34	46	57.5
1 hour(e)	40	40				
Oxidants						
$\mu g/m^3$						
1 hour	160	160	400	800	1,000	1,200
Nitrogen dioxide						
$\mu g/m^3$						
1 year	100	100				
24 hours			282	565	750	
1 hour			1,130	2,260	3,000	3,750
Hydrocarbons						
$\mu g/m^3$						
3 hours(e) (6-9 a.m.)		160				

(a) $\mu g/m^3$ - micrograms of pollutant per cubic meter of air.
mg/m^3 - milligrams of pollutant per cubic meter of air.
$[\mu g/m^3]^2$ - product of the concentration of one pollutant measured in micrograms per cubic meter and the concentration of a second pollutant measured in micrograms per cubic meter.

(b) National secondary ambient air quality standards are, in the judgment of the EPA Administrator, requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air.

(c) National primary ambient air quality standards are, in the judgment of the EPA Administrator, requisite to protect the public health.

(d) The Federal Episode Criteria specify that meteorological conditions are such that pollutant concentrations can be expected to remain at these levels for 12 or more hours or increase; or, in the case of oxidants, the situation is likely to reoccur within the next 24 hours unless control actions are taken.

(e) Maximum concentration allowed once yearly.

Source: 40 CFR 50-99.

By August 7, 1977, EPA was required to identify those portions of the country that were not meeting the primary or secondary NAAQS for particulates, sulfur oxides, nitrogen oxides, hydrocarbons, photochemical oxidants, or carbon monoxide. Areas for which sufficient data existed to permit their being identified as exceeding standards were designated as nonattainment areas for the pollutant(s) considered. Other areas were designated as attainment areas. Under the 1970 legislation, all states were to have attained the NAAQS by mid-1977. Under the 1977 amendments to the Clean Air Act, all NAAQSs must be attained by 1983, with special provisions for extending the primary NAAQS attainment dates for photochemical oxidants and carbon monoxide until 1987 at the latest. Thus, according to plan, all areas of the country should be attainment areas by 1987. Table 5-47 shows the number of Air Quality Control Regions (AQCR) that lie wholly or partially in each coal region and the number that are designated as nonattainment areas.

Under the amendments to the Clean Air Act, unless a state implementation plan (SIP) is approved, EPA is empowered to prevent or halt the construction of any new emission source which would seek to locate either in a nonattainment area or in an area from which the source could potentially exacerbate a NAAQS violation in a nearby nonattainment area. At the present time, EPA is moving to establish a uniform litigation-oriented approach to enforcing the act. Violation of the standards, criteria, or guidance of an EPA approved SIP would be sufficient basis for Federal (civil and criminal) enforcement. Inadequate administration of a SIP would permit EPA to displace the state authority and assume enforcement responsibilities.

In attainment areas, a specific EPA program to prevent significant deterioration of ambient air quality is in effect. Under EPA's regulatory scheme for prevention of significant deterioration (PSD), areas of the Nation having attained both primary and secondary NAAQS, which should include all areas of the country by 1987 at the latest, could be designated under any of three "classes." Specified numerical "increments" of particulate matter are permitted up to a level considered to be significant for areas designated within a particular class. The allowable PSD increments are presented in Table 5-48. By August 7, 1979, EPA must promulgate PSD regulations for hydrocarbons, photochemical oxidants, carbon monoxide, and nitrogen oxides which would become effective one year later. States must submit SIP revisions within 21 months of EPA's promulgation of the increments. All areas subject to PSD have been initially designated as Class II, with the exception of certain Federal lands which are mandatory Class I areas, such as national parks. The highly restrictive Class I numerical increments were designed to severely limit industry in order to protect pristine areas. All sources must be analyzed not only for air quality impact in their immediate area, but also for their impact on neighboring areas. In order to prevent deterioration of air quality in areas in which the most restrictive PSD numerical increments are applicable, it is necessary to control emissions from sources both within the geographic boundaries of the most restrictive areas and from sources locating in less restrictive areas if the sources in less restrictive areas could cause significant air quality deterioration in the more restrictive areas. For example, construction of a power plant in a Class III PSD area could be prohibited if an air quality analysis for the specific facility found that emissions were sufficient to violate the permitted increments of a Class II area several miles away. The allowable PSD increments are increases in pollutant levels over a baseline concentration as of January 6, 1975. The baseline concentrations represent a status quo point against which air quality is measured. Regardless of the allowable increments, the NAAQSs represent ceilings above which ambient concentrations will not be allowed to rise. All sources planning to locate in a given area are required by EPA to demonstrate that their emissions, in conjunction with the effects of growth and emission reductions occurring since the end of 1974, would not violate the applicable NAAQS or the allowable PSD increments in that area.

Although approval or disapproval of a source permit would be based on the emissions directly related to the source, the indirect or secondary emissions resulting from growth associated with the action, such as community expansion, must also be considered in the PSD increments. Temporary emissions such as those associated with construction are specifically exempt from consideration even if they would contribute to air quality

TABLE 5-47

STATUS OF ATTAINMENT FOR COAL REGION
AIR QUALITY CONTROL REGIONS (a)

REGION	PARTICULATES			SULFUR DIOXIDE			NITROGEN DIOXIDE			OXIDANTS		
	AREAS IN COMPLIANCE	AREAS WITH VIOLATIONS	AREAS WITH INADEQUATE DATA	AREAS IN COMPLIANCE	AREAS WITH VIOLATIONS	AREAS WITH INDEQUATE DATA	AREAS IN COMPLIANCE	AREAS WITE VIOLATIONS	AREAS WITH INADEQUATE DATA	AREAS IN COMPLIANCE	AREAS WITH VIOLATIONS	AREAS WITH INADEQUATE DATA
Northern Appalachian	1	11	--	6	4	2	--	1	11	--	5	7
Central Appalachian	1	8	--	7	2	--	4	--	5	1	1	7
Southern Appalachian	--	4	--	3	1	--	1	--	3	--	1	3
Eastern Interior	1	11	--	4	8	--	11	--	1	3	5	4
Western Interior	1	15	--	14	1	1	6	--	10	2	3	11
Texas	--	6	--	6	--	--	5	--	1	--	3	3
San Juan River	--	5	--	4	--	1	1	--	4	--	1	4
Uinta-Southwestern Utah	--	3	1	1	1	2	1	--	3	--	1	3
Green River-Hams Fork	--	3	--	2	--	1	--	--	3	--	--	3
Powder River	1	3	--	3	--	1	--	--	4	1	--	3
Fort Union	1	3	--	3	--	1	--	--	4	1	--	3
Denver-Raton Mesa	--	4	--	1	--	3	1	--	3	--	1	3
TOTAL	6	76	1	54	17	12	30	1	52	8	21	54

Total Regions = 83

(a) Source: Reference Number 84.

TABLE 5-48

PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS

APPLICABILITY	MAXIMUM ALLOWABLE DEGRADATION	
	SULFUR DIOXIDE	PARTICULATE MATTER
Class I Areas	2 $\mu g/m^3$ (annual arith. mean)	5 $\mu g/m^3$ (annual geo. mean)
(Restricted Development)	5 $\mu g/m^3$ (24-hour max.)	10 $\mu g/m^3$ (24-hour max.)
	25 $\mu g/m^3$ (3-hour max.)	
Class II Areas	20 $\mu g/m^3$ (annual arith. mean)	19 $\mu g/m^3$ (annual geo. mean)
(Modest Development)	91 $\mu g/m^3$ (24-hour max.)	37 $\mu g/m^3$ (24-hour max.)
	512 $\mu g/m^3$ (3-hour max.)	
Class III Areas	40 $\mu g/m^3$ (annual arith. mean)	37 $\mu g/m^3$ (annual geo. mean)
(Concentrated Development)	182 $\mu g/m^3$ (24-hour max.)	75 $\mu g/m^3$ (24-hour max.)[a]
	700 $\mu g/m^3$ (3-hour max.)	

[a] Value not to be exceeded more than once per year.

Source: 42 U.S.C. 7401.

degradation in excess of an ambient air quality standard.

Program Alternatives Analyses. The following discussion addresses the aggregated air emissions associated with each region and each alternative. In order to put these estimates in perspective, Table 5-49 contains the most recent EPA estimates of criteria pollutant total emissions on a national basis.

Tables 5-50 through 5-55 present data comparing the emissions associated with the low, medium, and high production projections of the no new leasing alternative with current (1976) emissions. The data represent estimates of emissions from all sources associated with the coal cycle. The three columns showing emissions at low, medium, and high production for 1976-1985 represent increases over the base case 1976 values. The three columns showing emissions at low, medium, and high production for 1990-1985 represent increases or in a few cases decreases over 1985 estimates.

Although differences occur from region to region and from pollutant to pollutant, the following general and well established trends can be seen from the totals for all regions for every pollutant:

- The 1985 emissions of any pollutant for the low production level would be about 50 percent greater than the base case.
- The 1990 increases for the low production level would only be from about one-third to one-half of the 1985 increases.
- The total emissions associated with the medium production projection in 1985 would be only slightly smaller than the emissions for the high production projection in 1985. In both cases they represent about a 75 percent increase over the 1976 base case.
- Relative to 1976 levels, total emissions by 1985 would increase by about 75 percent and by 1990 would double or triple under the high production projection.
- In general, this magnitude of increase could conceivably be large enough to prevent growth in the eastern or the western regions. In the industrialized East, the NAAQS could be exceeded and in the pristine West, the PSD requirements could be exceeded.
- On a percentage basis, the Texas Coal Region would experience the greatest increase. A tenfold increase would occur by 1990 in that region for all pollutants except hydrocarbons where a fivefold increase would occur over 1976 levels. The Uinta-Southwestern Utah Coal Region would experience the next highest increase.
- The Central Appalachian, Eastern Interior, Green River-Hams Fork, and Fort Union Coal Regions would experience the smallest increase, although, in general, a doubling would still occur.

Tables 5-56 through 5-61 show, for 1985 and 1990, the total emissions which would result under the no new leasing alternative together with the incremental change of the other alternatives measured against the no new leasing base case. Negative values indicate smaller amounts of emissions.

In the methodology employed to estimate emissions (the Coal Impact Estimation Program), power plant energy consumption on a Btu basis did not change from alternative to alternative within a given year and within the high, medium, or low production projection. Therefore, any differences in emissions would come from interregional shifts in coal mining, beneficiation, and transportation. Emissions from these sources would be minor compared to those from coal conversion or steam electric power plants and the small differences between the numbers in the table are to be expected.

Only two differences in sulfur oxides emissions in 1985 and 1990 (Table 5-56) are significant; both occur in the Western Interior Coal Region where about a six percent increase is forecast under the high case for the preferred program alternative and about a five percent decrease is forecast for the state determination of leasing levels alternative.

Particulates in 1985 and 1990 (Table 5-57) would generally decrease in the eastern regions for each alternative when compared with the no new leasing base case. For the western regions these values would generally increase. In both cases, however, the changes would rarely be greater than 10 percent and never more than 15 percent above the no new leasing alternative.

Since 1850, the amount of carbon dioxide in the atmosphere is estimated to have increased by 40 ppm from 290 ppm. A fourth of this total

TABLE 5-49

NATIONAL EMISSIONS ESTIMATES FOR 1975

(10^3 tons/year)

SOURCE	PARTICULATES	SULFUR OXIDES	NITROGEN OXIDES	HYDROCARBONS	CARBON MONOXIDE
Fuel Combustion (Point and Area)	5,800	22,900	12,500	1,500	1,300
Industrial (Point)	7,700	4,800	700	9,300	7,900
Solid Waste Disposal (Point and Area)	500	50	200	900	3,100
Transportation (Area)	1,300	800	10,800	13,200	79,400
Miscellaneous (Area)	500	0	100	3,900	2,800
Total (Point and Area)	15,800	28,500	24,300	28,800	94,500

Source: Reference Number 85.

TABLE 5-50

NO NEW LEASING ALTERNATIVE, SULFUR OXIDES AIR EMISSIONS
(Tons/yr)

REGIONS	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	198,312	21,124	- 1,027	15,350	41,688	22,502	178,663
Central Appalachian	107,946	179	34,946	16,173	61,568	12,520	84,912
Southern Appalachian	46,272	35,626	13	63,800	12,802	62,650	44,134
Eastern Interior	250,325	91,512	34,921	107,150	33,847	127,079	60,659
Western Interior	159,545	190,098	27,589	286,568	268,259	301,098	302,401
Texas	15,531	57,004	19,191	92,979	88,666	94,284	96,728
Powder River	5,950	6,636	3,645	7,397	3,824	9,034	4,520
Green River-Hams Fork	7,113	4,869	1,892	6,957	483	7,298	1,442
Fort Union	7,874	4,150	4,028	4,247	11,324	11,055	7,183
San Juan River	6,803	210	1,510	525	800	4,548	8,258
Uinta-Southwestern Utah	3,554	13,207	4,731	13,289	2,872	14,870	6,900
Denver-Raton Mesa	5,498	5,106	2,520	7,036	5,465	8,233	7,060
TOTAL	814,723	429,721	133,959	621,471	531,598	679,721	802,815

TABLE 5-51

NO NEW LEASING ALTERNATIVE, PARTICULATE AIR EMISSIONS
(Tons/yr)

REGIONS	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1965-1976	1990-1985
Northern Appalachian	119,933	14,468	- 2,488	11,786	21,553	16,217	91,305
Central Appalachian	60,609	406	9,115	5,679	19,685	2,433	38,933
Southern Appalachian	33,677	23,249	- 408	43,830	7,872	44,957	29,142
Eastern Interior	99,797	45,885	22,097	50,374	29,874	50,856	47,829
Western Interior	45,025	50,821	7,384	76,546	72,471	80,724	85,787
Texas	14,655	58,988	19,071	92,631	89,622	91,782	104,799
Powder River	10,275	21,233	7,981	27,901	10,792	37,210	26,331
Green River-Hams Fork	7,448	4,842	4,312	10,313	1,935	13,161	2,724
Fort Union	9,083	3,434	5,246	2,939	15,185	15,098	9,447
San Juan River	7,432	925	4,419	2,460	6,374	8,176	14,716
Uinta-Southwestern Utah	3,646	9,664	5,308	11,778	5,125	14,942	7,964
Denver-Raton Mesa	4,084	6,022	5,379	8,596	8,009	10,527	6,153
TOTAL	415,664	239,937	87,416	344,833	288,497	386,083	387,264

TABLE 5-52

NO NEW LEASING ALTERNATIVE, CARBON MONOXIDE AIR EMISSIONS
(Tons/yr)

REGIONS	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	99,891	14,366	- 286	18,259	16,675	16,459	67,727
Central Appalachian	36,740	2,688	9,125	8,220	19,706	9,333	28,636
Southern Appalachian	33,676	21,320	1,071	35,962	11,534	37,075	28,763
Eastern Interior	68,314	25,156	7,519	29,416	12,658	33,598	21,515
Western Interior	46,971	36,208	6,960	53,904	51,082	58,893	65,585
Texas	16,921	41,654	13,552	66,525	62,932	67,888	72,993
Powder River	10,670	11,016	4,837	13,687	6,748	17,017	9,460
Green River-Hams Fork	9,773	5,986	2,627	2,022	2,304	10,309	4,555
Fort Union	14,047	6,430	5,468	6,817	17,332	17,063	12,771
San Juan River	5,209	500	1,273	1,023	1,462	4,011	6,764
Uinta-Southwestern Utah	4,067	6,382	2,660	7,374	3,061	9,241	4,706
Denver-Raton Mesa	12,377	10,314	4,787	14,114	11,462	16,739	12,529
TOTAL	358,656	182,020	59,593	257,323	216,956	297,626	310,462

TABLE 5-53

NO NEW LEASING ALTERNATIVE, NITROGEN OXIDES AIR EMISSIONS
(Tons/yr)

REGIONS	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	557,342	63,464	- 1,080	48,673	126,677	73,066	497,565
Central Appalachian	251,794	7,414	76,981	45,265	142,809	49,938	199,388
Southern Appalachian	205,431	156,558	970	280,109	59,649	276,037	197,290
Eastern Interior	444,357	162,571	58,207	191,927	66,742	226,529	119,259
Western Interior	246,164	245,588	40,246	367,907	346,502	392,599	410,192
Texas	93,705	338,468	112,956	550,885	526,988	558,723	585,698
Powder River	48,181	59,925	33,633	65,910	10,033	77,402	33,364
Green River-Hams Fork	53,523	37,117	14,902	53,613	- 4,664	56,291	8,681
Fort Union	74,919	31,313	40,661	20,018	120,199	103,707	54,842
San Juan River	40,642	1,427	9,175	3,536	1,979	27,662	49,886
Uinta-Southwestern Utah	16,872	63,976	22,566	64,074	13,588	71,040	33,695
Denver-Raton Mesa	45,967	60,988	34,364	83,585	59,562	96,816	52,120
TOTAL	2,078,879	1,228,839	443,581	1,775,502	1,470,064	1,617,211	2,241,980

TABLE 5-54

NO NEW LEASING ALTERNATIVE, HYDROCARBON AIR EMISSIONS
(Tons/yr)

REGIONS	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	122,251	18,442	-2,072	32,376	5,116	16,654	42,579
Central Appalachian	16,085	930	3,276	3,361	8,225	4,119	12,996
Southern Appalachian	26,661	11,504	1,432	15,222	9,314	17,882	15,856
Eastern Interior	52,913	22,655	5,440	23,982	11,517	26,796	19,957
Western Interior	26,244	16,040	4,416	24,288	24,947	26,771	36,851
Texas	9,359	15,769	5,463	24,732	20,427	25,361	27,650
Powder River	5,852	4,326	1,757	5,556	12,748	8,272	6,079
Green River-Hams Fork	4,983	2,919	1,052	3,969	5,856	4,522	3,361
Fort Union	7,461	6,282	3,482	9,716	7,913	11,508	10,322
San Juan River	1,809	206	392	453	4,049	1,348	2,195
Uinta-Southwestern Utah	5,405	- 1,505	860	1,044	3,938	4,468	1,783
Denver-Raton Mesa	9,862	6,232	2,159	7,921	7,795	10,070	11,834
TOTAL	288,885	103,860	27,657	152,620	121,845	157,771	191,463

TABLE 5-55

NO NEW LEASING ALTERNATIVE, CARBON DIOXIDE AIR EMISSIONS
(million tons/yr)

REGION	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	374.5	40.0	-3.8	29.5	82.2	44.2	372.9
Central Appalachian	168.5	-1.5	47.3	20.4	84.6	19.2	141.9
Southern Appalachian	119.0	92.1	-1.4	167.8	30.2	165.0	278.6
Eastern Interior	278.0	106.4	45.0	122.5	51.9	143.9	243.0
Western Interior	106.9	128.7	20.4	194.2	173.5	203.7	422.6
Texas	37.8	163.4	56.1	266.2	245.6	267.8	557.4
Powder River	18.4	33.3	17.4	38.1	18.6	49.6	63.1
Green River-Hams Fork	23.4	17.5	8.7	27.6	-3.5	29.3	28.9
Fort Union	27.7	15.0	20.8	12.4	56.9	50.7	76.2
San Juan River	21.1	0.8	5.8	2.4	7.9	16.0	43.9
Uinta-Southwestern Utah	9.8	37.9	15.2	39.3	6.0	45.1	65.6
Denver-Raton Mesa	11.9	26.2	16.7	35.7	22.3	41.5	63.7

TABLE 5-56

SULFUR OXIDE EMISSIONS

(tons/year)

COAL REGION	Program Alternatives: NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	219423	213649	220801	-26.3	-13.4	-223	-8028	-8015	-7765	13.0	-7962
Central Appalachian	168112	124106	125453	-254	-846	-1551	-622	-694	-506	-406	-720
Southern Appalachian	81885	110059	108909	-26.3	-1982	675	-1355	-1628	-1634	-3449	-1600
Eastern Interior	341824	357462	377391	-26.4	-734	2275	-985	-999	1624	-10560	-2392
Western Interior	349603	446072	460602	-82.4	-17226	31933	-23380	-21465	-5536	12984	-22592
Texas	72524	108499	109804	52.1	416	-4331	-862	-459	-1191	-396	2231
Powder River	12576	13337	14974	-19.4	-9.09	330	-18.7	-4.3	454	-133	-172
Green River-Hams Fork	11974	14062	14404	-14.4	289	390	-97.2	22.0	856	570	71.3
Fort Union	12013	12110	18918	799	862	256	860	872	1559	172	1410
San Juan River	7012	7327	11350	-2.0	-1	10.6	-39.5	-38.5	-6.26	-917	-16.1
Uinta-Southwestern Utah	16759	16841	18421	-3.6	446	341	51.4	187	653	448	453
Denver-Raton Mesa	10590	12520	13717	-28.4	255	276	235	249	794	1088	7.43
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	218588	255337	399464	3931	350	9524	-2.3	-46.3	228	268	-139
Central Appalachian	143242	185674	210365	19	91.3	8972	3279	58.8	1707	41.2	-4826
Southern Appalachian	82088	122861	153043	19.7	97.5	10789	1109	55.7	778	250	-1582
Eastern Interior	376037	391309	438050	4980	86.5	19132	612	-2033	1030	1477	-4424
Western Interior	377788	714331	762603	859	294	43097	-15591	-15912	20500	16500	-39259
Texas	91879	197164	209532	-207	35.4	2006	-3082	-2621	-2587	-801	-2644
Powder River	16362	17161	19494	62	358	2706	75.8	-184	734	467	-541
Green River-Hams Fork	13970	14545	15846	77.2	172	2263	-748	-840	591	350	-995
Fort Union	16209	23435	26101	17.4	59.5	503	238	346	1251	-1598	420
San Juan River	8536	8127	19608	154	59.3	151	-7.21	-87.2	27.4	-91.5	-175
Uinta-Southwestern Utah	21516	19713	25321	573	106	1591	-997	-890	313	124	-718
Denver-Raton Mesa	13316	17985	20777	21.3	106	2658	-213	-201	462	554	-734

TABLE 5-57

TOTAL SUSPENDED PARTICULATES EMISSIONS

(tons/year)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	134395	131713	136144	-0.5	-16.4	-216	-3829	-3835	-3890	-18.1	-3888
Central Appalachian	61009	66282	136144	-11.1	-387	-809	-182	-291	-1712	-357	459
Southern Appalachian	56921	77501	78629	-11.5	-1475	143	-1058	-1107	-625	-3092	-1723
Eastern Interior	145676	150165	150647	-11.6	237	-986	-350	-198	-1113	-3873	201
Western Interior	95828	121554	125731	-52.4	-4581	8382	-6173	-5608	-1949	3014	-5696
Texas	73638	107280	106432	72.9	673	-5783	-848	-367	-2910	-1151	3851
Powder River	31503	38171	31495	-8.5	216	3333	11.2	86.1	2995	-39.0	-2428
Green River-Hams Fork	12287	17758	20606	-6.3	679	3707	173	135	4647	4480	-2018
Fort Union	12511	12017	24176	1174	1283	235	1286	1291	2527	-662	2532
San Juan River	8356	9891	15607	-0.9	26.3	44.6	-36.7	-36.2	655	-1220	910
Uinta-Southwestern Utah	13368	15422	18587	-1.59	352	288	87.9	139	1216	-176	276
Denver-Raton Mesa	10100	12674	14605	-12.4	435	281	409	416	1120	1914	213
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	131991	153266	227449	869	219	3349	-41.6	-30.4	-155	429	694
Central Appalachian	70205	85967	97211	-3.7	-557	97.6	918	-131	-483	-627	219
Southern Appalachian	56596	85373	107766	8.6	-94.2	6965	752	45.7	1018	-1562	-2707
Eastern Interior	167857	180039	198476	1.5	-1585	-3162	-2539	-1156	-6425	-1370	5832
Western Interior	103473	194025	211518	188	-790	6526	-4721	-4301	3895	2761	-9446
Texas	92781	196903	211231	-325	-4063	-4923	-3272	-2896	-9897	-5715	-3471
Powder River	39546	48963	57826	111	11817	34476	5772	1223	17959	11404	-4153
Green River-Hams Fork	16644	19693	23330	472	2541	7544	-174	108	6171	5967	-4631
Fort Union	17831	27832	33623	7.6	-830	-1129	104	614	1671	-5166	1179
San Juan River	12782	16264	30323	315	-964	34.7	-362	-144	324	-2346	570
Uinta-Southwestern Utah	18628	20548	26551	556	-591	429	-1175	-601	635	-3522	-1135
Denver-Raton Mesa	15570	20683	20758	180	181	1274	-122	-216	278	-1439	-898

increase has occurred within the past 10 years [109]. Most of the 40 ppm increase is attributed to the increased use of fossil fuels as the result of the industrial revolution. The impacts of increased coal utilization should be studied on a world-wide basis since even a 2° to 3°C global temperature rise could have profound climatic effects. For example, resultant warming of ocean waters could disrupt marine life and ocean circulation. In addition, changes in temperature distribution in the atmosphere could cause changes in other climate variables such as precipitation, cloud cover, winds, and humidity [110]. World-wide agriculture production and distribution could be detrimentally affected. The accuracy of predicting future carbon dioxide levels in the atmosphere is limited by uncertainty about its final destination (fate). The amount of carbon dioxide released to the atmosphere each year is speculative on a global basis because of uncertainties about factors like the effects on carbon dioxide production of forest clearing and the mechanisms for carbon dioxide removal from the atmosphere. Predictions about the extent to which greater utilization of fossil fuels, especially coal, will contribute to atmospheric carbon dioxide levels adds another factor of uncertainty to the prediction process.

Table 5-55 shows that carbon dioxide emissions in 1976 due to coal production totaled about 1,197 million tons (the sum of the 1976 base case column). As shown in Table 5-61 for the no new leasing medium level alternative, emissions are projected to be about 2,152.7 million tons in 1985 and 2,929 million tons in 1990. These estimates represent increases of 955.7 million tons and 1,732 million tons, respectively, over the 1976 base case. The preferred medium level alternative is projected to contribute 948.3 million tons and 1,768 million tons in 1985 and 1990, respectively, over the 1976 base case. The preferred alternative for the proposed Federal coal management program is estimated to produce less carbon dioxide in 1985 than would be produced under the no new leasing base case; in 1990, the preferred alternative program is estimated to produce 36 million tons (or 1.2 percent) more emissions than would be produced under the no new leasing base case. Presently, the atmosphere contains about 700 billion metric tons of carbon. Annual global carbon dioxide emissions in 1976 were about 20 billion tons, primarily due to fossil fuel burning [110]. The total carbon dioxide emissions estimated for 1976 resulting from U.S. coal development activities (1,197 million tons) represents about 5.9 percent of the 1976 global carbon dioxide emissions. Assuming that the only contributions to global carbon dioxide emissions were from coal development activities, then the U.S. share of these emissions would be about 9.6 percent and 12.8 percent for 1985 and 1990, respectively.

The 1985 and 1990 values for carbon monoxide emissions (Table 5-58) show a general decrease for the eastern regions and a general increase for the western regions under other alternatives. Carbon dioxide in 1985 and 1990 (Table 5-61) would generally decrease in the eastern regions for each alternative when compared with the no new leasing base case. For the western regions these values would generally increase. For the eastern regions the decrease is not more than six percent, while for the western regions the increase is less than 90 percent.

Increases in nitrous oxides in 1985 and 1990 (Table 5-59), would be generally less in the eastern regions for the other alternatives than for the no new leasing alternative although these other values are still usually only a few percentage points below the no new leasing base case. For the western regions in 1985, no change larger than about two percent is projected.

For hydrocarbons (Table 5-60) in 1985, only two alternatives would lead to an increase of as much as one percent over the no new leasing base case; both increases would occur in the Denver-Raton Mesa Coal Region. Similar results would be obtained in 1990.

5.3.3 Ecological Impacts

Ecosystems in each coal region would experience a number of impacts from increased coal development activity. These impacts would include primary disturbance and destruction of vegetation and wildlife populations and introduction of hazards to biota.

Secondary impacts resulting from induced growth, changes in plant and animal communities, and adjustment of ecosystems would also occur. Disturbances and modifications of habitats adjacent to the areas of principal impacts would diminish with distances but this "area of influence" could encompass as much as five times the

TABLE 5-58

CARBON MONOXIDE EMISSIONS
(tons/year)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	114222	118116	116315	-68.1	-35.7	114	-5133	-5100	-4452	32.7	-4966
Central Appalachian	39399	44930	46043	-60.6	-242	-124	-190	-187	267	-91.6	-30.9
Southern Appalachian	54966	69607	70721	-60.9	-1124	589	-790	-900	-401	-1759	-860
Eastern Interior	93438	97697	101880	-64.4	-126	647	-250	-205	797	-1894	-325
Western Interior	83084	100780	105770	-189	-2258	4896	-3073	-2734	817	1668	-2486
Texas	58547	83418	84781	-459	298	-2815	-595	-295	-595	-317	1769
Powder River	21663	24334	27664	-45.0	-17.8	963	-34.0	-6.54	1116	-132	-567
Green River-Hams Fork	15743	18884	20065	-32.8	320	1072	-67.3	33.5	1682	1255	-295
Fort Union	20450	20837	31084	1011	112.3	440	1115	1142	2365	41.9	2003
San Juan River	5706	6229	9217	-50.6	-0.109	29.5	-28.8	-26.3	137	-649	146
Uinta-Southwestern Utah	10445	11436	13303	-9.10	254	259	27.7	106	458	249	268
Denver-Raton Mesa	22658	26459	29084	-64.7	479	580	437	470	1632	2044	57.6
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	114438	134791	184042	2730	3620	5218	-30.8	-121.0	565	715	-319
Central Appalachian	48963	64637	74679	44.7	190	3100	755	-89.6	833	513	-1330
Southern Appalachian	56478	81141	99482	45.7	219	6251	586	-50.9	847	494	-1214
Eastern Interior	101423	110355	123395	140	135	38296	26.6	-600	289	627	-871
Western Interior	91409	151867	171357	235	585	8558	-2132	-2333	3848	3626	-5739
Texas	72506	146350	157774	-121	-272	1469	-2099	-1855	-2193	-659	-2065
Powder River	26826	31081	37124	83.7	2401	8617	1134	48.3	3894	2591	-1352
Green River-Hams Fork	18608	21189	24620	149	657	3230	-593	-622	1723	1555	-1697
Fort Union	26308	38168	43855	40.3	-12.2	826	274	466	1826	-2422	586
San Juan River	7016	7691	15981	104	-139	130	-98.6	-84	61.2	65.6	-56.4
Uinta-Southwestern Utah	13170	14496	18009	308	71	1081	-614	-553	266	89.6	-496
Denver-Raton Mesa	27915	37921	41613	48.5	243	12713	-411	-400	989	1162	-1445

TABLE 5-59

NITROGEN OXIDE EMISSIONS

(tons/year)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	620720	605929	630322	-170	-87.9	-84.6	-21272	-21187	-19568	82.9	-20851
Central Appalachian	259125	296976	301650	-170	-1892	-2824	-1422	-1529	-231	-848	-1289
Southern Appalachian	361904	485455	481383	-171	-8476	3128	-5826	-6947	-6356	-14865	-6766
Eastern Interior	606862	636198	670800	-172	-1212	4320	-1757	-1687	3818	-17856	-3703
Western Interior	491489	613803	638495	-536	-19672	38232	-26719	-24323	-2378	14733	-24654
Texas	432099	644517	652354	295	2454	-25764	-5135	-2734	-7084	-2433	13338
Powder River	108043	114028	125519	-126	-55.3	2893	-132	-23.8	3968	-1295	-1942
Green River-Hams Fork	90594	107089	109768	-93.4	2345	3427	-729	192	7098	5021	249
Fort Union	106157	94862	178551	9394	10275	2260	10282	10357	17334	1940	16495
San Juan River	40026	44171	68297	-13.1	-2.6	72.5	-235	-228	84.5	-5478	62.8
Uinta-Southwestern Utah	80836	50934	87900	-23.5	2097	1622	241	878	3155	2098	2140
Denver-Raton Mesa	106863	129460	142691	-184	4031	2963	3775	3867	9832	16675	-335
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	620886	732606	1127887	10369	1337	27843	-58.2	-301	1432	1759	-837
Central Appalachian	337303	439785	501038	123.0	559	20311	6998	-78.9	4549	1134	-10798
Southern Appalachian	364113	545104	678673	128	625	47587	4685	133	3840	1521	-7162
Eastern Interior	666315	702940	790061	924	469	34216	853	-3702	2252	3292	-7556
Western Interior	535606	960305	1048687	1292	1805	57142	-17961	-18778	26499	22710	-46422
Texas	546127	1171504	1243052	-1222	-162	11467	-18265	-15564	-15933	-5096	-15812
Powder River	142589	124060	158883	545	4130	25219	1896	-737	7544	4768	-4291
Green River-Hams Fork	106173	102426	118449	641	1590	15022	-5333	-5913	4975	3309	-7694
Fort Union	147909	215060	234693	113	214	2397	3368	4996	13450	-20186	6562
San Juan River	51332	46151	118183	910	156	868	-178	-537	160	520	-896
Uinta-Southwestern Utah	103573	94522	121597	2720	513	7578	-4665	-4170	1537	597	-3417
Denver-Raton Mesa	142563	189022	194811	138	691	8535	-3139	-2631	4993	5972	-9990

TABLE 5-60

HYDROCARBON EMISSIONS
(tons/year)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	138671	152606	136883	-43.5	-22.0	-219	-9789	-9767	-9354	21.5	-9681
Central Appalachian	16994	19426	20183	-41.9	-86.4	88.9	-77.6	-64.0	315	-14.1	21.3
Southern Appalachian	38144	41862	44521	-43.4	-80.6	469	-557	-631	-275	-704	-609
Eastern Interior	75547	76874	79687	-43.6	-102	437	-156	-132	533	-249	-225
Western Interior	42216	50464	52947	-136	-703	1864	-972	-831	1022	655	-612
Texas	25109	34072	34702	-18.4	141	-675	-159	-51.4	6.65	-33.1	687
Powder River	10162	11393	14109	-32	-151	401	-24.6	-7.10	454	-29.9	-84
Green River-Hams Fork	7891	8941	9494	-23.7	79.7	314	-34.6	4.22	542	292	-16.2
Fort Union	13724	17157	18949	340	326	291	318	337	901	49.2	626
San Juan River	2073	2260	3156	-33.3	-1.22	17.4	-10.0	-8.33	44.2	-188	27.8
Uinta-Southwestern Utah	3836	6446	9870	-5.97	137	222	13.0	57.2	252	140	149
Denver-Raton Mesa	16070	17759	19909	-46.8	290	400	265	288	1055	1057	37.7
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	136916	157722	179462	5476.3	272	5328	-14.4	-76.4	366	440	-220
Central Appalachian	20574	27652	33179	31.3	152	1639	225	-66.8	454	398.0	-547.0
Southern Appalachian	39890	51176	60377	32.5	161.0	2707	433.0	-33.9	588.0	417.0	-816.0
Eastern Interior	81307	88391	99654	86.8	144.0	114458	52.9	-487	256	698	-804
Western Interior	47616	75412	89798	131	487	4663	-717	-900	1904	1949	-22770
Texas	30844	54499	62352	-30.1	74.1	1017	-687	-631	-420	64.2	-730
Powder River	12152	24140	20188	39	547	3093	-70.7	-383	1119	730	-790
Green River-Hams Fork	9115	14796	12855	46.9	197	1176	-498	-566	658	477	-827
Fort Union	17483	25070	29271	28.6	102.0	1024	-73.5	-109.0	836	-451	240
San Juan River	2489	6309	5351	32.5	-10.4	83.7	20.3	-28.6	56.8	41.9	-99.9
Uinta-Southwestern Utah	4739	10384	11653	94.7	34.8	725	-451	-408	179	64.8	-348
Denver-Raton Mesa	18569	25555	31743	35.1	175	37135	-257	-253	652	782	-922

TABLE 5-61

CARBON DIOXIDE EMISSIONS
(million tons/yr)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	414.5	404.0	418.7	0	0	-0.6	-14.7	-14.7	-14.7	0	-14.8
Central Appalachian	167.0	188.9	187.7	0	-1.2	-2.5	- 0.8	- 1.0	- 2.1	-0.7	- 0.4
Southern Appalachian	211.1	286.8	284.0	0	-5.5	1.3	- 3.7	- 4.4	- 4.6	-10.0	- 4.9
Eastern Interior	384.4	400.5	421.9	0	-0.4	1.2	- 1.0	- 0.9	0.6	-11.3	- 1.9
Western Interior	235.6	301.1	310.6	-0.1	-11.8	21.8	-16.0	-14.7	- 4.5	8.6	-15.3
Texas	201.2	304.0	305.6	0.2	1.5	-13.8	- 2.4	- 1.2	- 5.0	- 1.6	7.5
Powder River	51.7	56.5	68.0	0	0	2.9	0	0	2.8	- 0.7	- 2.4
Green River-Hams Fork	40.9	50.6	52.7	0	1.5	3.6	- 0.2	0.2	5.7	5.0	- 1.1
Fort Union	42.7	40.1	78.4	4.7	5.0	0.9	5.0	5.0	8.1	0.2	8.2
San Juan River	21.9	23.5	37.1	0	0	0	- 0.2	- 0.2	0.3	- 3.1	0.5
Uinta-Southwestern Utah	47.7	49.1	54.9	0	1.3	1.0	0.2	0.5	2.3	1.0	1.3
Denver-Raton Mesa	38.1	47.6	53.4	0	2.2	1.2	2.1	2.1	4.5	8.8	- 0.2
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	410.7	486.2	747.4	7.3	0.6	16.7	0	0	0	0.4	0.5
Central Appalachian	214.3	273.5	310.4	0	- 0.5	10.2	4.5	0	1.4	-0.7	-5.2
Southern Appalachian	209.7	317.0	397.6	0.1	- 0.3	27.8	2.9	0.1	1.8	-1.3	-5.4
Eastern Interior	429.4	452.4	521.0	0.5	1.4	17.8	1.5	0	-1.2	2.3	2.9
Western Interior	256.0	474.6	529.5	0.4	12.7	25.4	2.1	2.4	26.0	23.1	-12.7
Texas	257.3	549.6	595.2	-0.8	5.8	0.4	-0.6	0.8	-4.1	2.5	0.5
Powder River	69.1	75.1	81.5	0.3	9.1	29.5	4.9	1.1	14.0	8.8	- 3.6
Green River-Hams Fork	49.6	47.5	52.3	0.6	6.1	11.0	1.0	0.9	9.9	8.7	- 2.6
Fort Union	63.5	96.7	103.9	0.1	-2.9	-0.6	- 1.0	0	4.0	-14.5	1.1
San Juan River	27.7	31.4	65.0	0.1	-0.2	0.2	0.1	0	0.5	0.4	0.1
Uinta-Southwestern Utah	62.9	55.1	75.4	0.4	2.7	3.9	- 0.3	0.3	4.2	1.5	0.1
Denver-Raton Mesa	54.8	69.9	75.6	0.1	1.5	7.2	- 0.1	0.3	3.4	3.5	-3.3

area directly disturbed, depending on species affected and type of impact [48].

Since the specific tracts which might be leased are presently unknown, it is not possible to indicate exact habitats which would be lost. Existing legislation and/or the criteria which establish some land areas as unsuitable (see Section 3.2.2 and Section 5.4.8), however, protect sensitive habitats, such as endangered species critical habitat, alluvial valley floor habitat, wetlands, National Wildlife Refuges, National Wilderness Areas, Federally-designated wilderness study areas, high priority migratory bird habitat, raptor nests and roosts, and habitat for resident high interest wildlife species.

The severity of impacts on regional ecosystems under the program alternatives would be affected by the frequency of disturbance, which depends in part on the rate of growth in coal related activities and whether the activities would be concentrated or dispersed. In general, the ecologic harm done to a region will increase under those alternatives which involve the largest amounts of coal production and coal consumption and the most land disturbance.

Off-road vehicles (ORVs) would be frequently used during the exploration phase of coal development as well as for recreation. The immediate impact of ORV travel would be to the surface where low growing vegetation might be injured and destroyed. Repeated travel over the same route could result in soil compaction, decreased water infiltration, and interference with root growth [49]. Increased runoff resulting from a reduced capacity of the compacted soils to absorb rainfall could lead to erosion, the formation of ruts, and increased sediment loadings in adjacent waterways. Concentrated ORV travel and frequent disturbances (noise and man's presence) in a given area might affect wintering big game, upset breeding behavior of animals and birds, and result in direct loss of some wildlife.

Vegetation removed during site preparation would result in loss of natural site productivity for wildlife. Indirect or secondary impacts would include an increase in the potential for site erosion, sedimentation, and introduction of pollutants into adjacent waterways, as well as disturbance of adjacent vegetation, habitat, and wildlife. Animal life would be adversely affected by losses of food, cover, and habitat. The initial impact would be greatest to soil micro- and macro-organisms, arthropods, small burrowing mammals, ground nesting birds, and slowly moving forms such as amphibians and reptiles. However, due to their relatively rapid population turnovers and high reproductive rates, these same groups of animals would likely be the first to repopulate reclaimed areas. Insects and other arthropods would begin to repopulate disturbed areas during and after revegetation. Diversity, however, could be lower than before development.

While direct mortality of larger, more mobile wildlife species would be rare, loss or disturbance of habitat would cause increased competition for food, cover, nesting sites, and territory, thereby potentially reducing wildlife populations over time. Comparatively speaking, fewer numbers of predators and large game mammals would be affected by habitat loss as both generally range over a larger territory than do smaller creatures. The losses which might occur, however, would tend to be more long-term due to slower population turnovers and lower reproductive rates.

Wildlife dependent upon specific seasonal habitats would be affected by activities which removed or reduced these habitats. If development were to reduce habitats which presently limit the size of a particular migratory wildlife population, that population would also be reduced in other habitat areas. Further secondary impacts could then be felt by predators, prey, or other links in the food chain of that species. Lands undergoing coal development would decrease the total area available for wildlife and, initially, create increased crowding of adjacent habitats. Populations in excess of a habitat's carrying capacity would, however, eventually diminish to a level equal to or lower than that carrying capacity.

Ecosystems beyond the immediate development area could be temporarily or permanently disturbed by noise, air, and water emissions from community expansion; increased human presence and activity; and plant and mine operations. Most species tolerate human intrusions only to a certain point. Others, such as pronghorn antelope, are very wary of human presence [50]. The extent of these impacts would be dependent on the tolerance of a given species.

Coal development would result in the introduction of additional hazards into the environment. Fences constructed along rights-of-way, or around

areas under construction and areas under rehabilitation, would reduce some populations such as antelope [51]. Increased vehicular traffic would result in higher numbers of roadkills of various species. The presence of mining operations and support facilities could change migration patterns and grazing movements through changes in the quantity and quality of forage and water, as well as physically restricting movements by erecting impassable barriers, such as tall fences, deep ditches, and heavily travelled roadways.

Factors which limit distribution of aquatic organisms include temperature, turbidity, pH, (acidity or alkalinity), water velocity, oxygen supply, conductivity, and substratum. Any one of these factors could be changed in adjacent streams and downstream rivers by effluents, accidental spills, impoundments, and/or erosion. Sufficient amounts of leached substances and saline groundwater released to surface waters from excavations or overburden piles could cause a shift in pH and conductivity into a range that would interfere with the vital functions of aquatic organisms. Acid drainage is a potential problem particularly in the East, while salinity poses more of a problem in the West.

Sediment introduced into surface waters by runoff could affect aquatic life in many ways; it could clog fish gills, bury eggs of both fish and insects, bury food sources, smother aquatic vegetation, and alter habitat. In addition, there are many indirect ways in which sediment could disrupt an aquatic system. For example, turbidity would decrease light penetration, thereby decreasing photosynthetic activity of aquatic plants and phytoplankton. This effect, in turn, could result in a reduction of dissolved oxygen concentration.

Development activities near surface water systems might also affect aquatic life through the introduction of various materials into the water body by overland runoff. Runoff frequently contains inorganic and organic matter originating from decayed vegetation and from the soil itself. Overland runoff could also leach minerals from exposed soils or might carry residues (oils, grease, pesticides, etc.) which are used during the construction period or which are present in the soil. The exact quantities of various pollutants which would enter a given water body would depend, to some extent, on the care taken to minimize their entry.

Any change in the physical characteristics of the stream substratum could result in extensive alteration in benthic composition (stream bottom communities). Species dependent on running water for food supply and on hard attachment surfaces for maintaining their position could be replaced by organisms which typically live in the substratum rather than on it.

Alteration of benthic composition would affect species dependent upon these organisms as a food source. The number of different species of large invertebrates and fish in an impounded pool is usually substantially lower than in the pool's former unimpounded, free-flowing status [52]. Game fish would be replaced by more tolerant species, such as carp.

Large volumes of water would be required in all of the regions for mining and reclamation activities, coal conversion and use plants, conjunctive developments, and population increases (see Section 5.3.2.6). Water withdrawals could affect aquatic systems by reducing habitats and by changing the physical regimes (principally dissolved oxygen and temperature) of the remaining water.

5.3.3.1 Productivity Loss. Table 5-62 presents potential losses in thousands of tons of natural primary production (biomass) for the no new leasing alternative at low, medium, and high production projections in 1985 and 1990. The table also compares the no new leasing with the other program alternatives. These potentials are based on the product of unweighted averages of the amount of material produced by acre (excluding agriculture) for each region and the surface area disturbed in each region. Potential losses weighted by major natural vegetation types are given in Appendix D, Tables D-4 through D-25. While such actual productivity losses will vary, until specific sites are determined this comparison provides the most feasible way to indicate differences between alternatives and between regions.

Comparison between the no new leasing and the preferred alternatives at the medium coal production projection in 1985 shows that coal related development under the preferred program would remove less natural productivity in the Appalachian and Western Interior Coal Regions and would remove up to eight percent more in the Eastern Interior, Texas, and all western coal

TABLE 5-62
COMPARISONS OF POTENTIAL PRIMARY PRODUCTIVITY LOSS

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	250	246	254	0.04	- .05	- 0.6	- 6.8	- 6.9	- 7.3	- 0.1	- 7.1
Central Appalachian	140	150	140	0.0	- 1.1	- 2.3	- 0.4	- 0.7	- 5.9	- 1.2	- 1.8
Southern Appalachian	106	145	152	0.0	- 3.0	- 0.5	- 2.2	- 2.0	- 0.03	- 7.6	- 4.6
Eastern Interior	224	226	222	0.0	1.3	- 2.4	- 0.5	- 0.01	- 2.0	- 6.1	1.0
Western Interior	114	141	145	-0.05	- 5.8	9.5	- 7.4	- 6.4	- 8.4	0.06	21.0
Texas	140	194	186	0.11	1.4	- 9.6	- 0.9	- 0.2	- 7.0	- 3.0	8.1
Powder River	34	42	55	0.0	0.1	4.1	0.03	0.06	- 3.4	- 0.2	- 3.3
Green River-Hams Fork	16	27	33	0.0	1.2	8.0	0.4	0.3	9.8	9.7	- 4.8
Fort Union	19	23	42	1.6	1.7	0.3	1.7	1.7	4.1	- 2.6	4.3
San Juan River	4	5	8	0.0	0.03	0.05	- 0.02	- 0.02	1.3	- 1.1	1.8
Uinta-Southwestern Utah	11	13	15	0.0	0.3	0.3	0.1	0.1	0.8	0.1	0.3
Denver-Raton Mesa	11	15	19	0.0	0.7	0.3	0.6	0.6	2.3	3.7	0.9
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	232	267	388	3.4	0.3	5.5	- 0.07	- 0.1	- 0.5	1.1	1.6
Central Appalachian	147	177	201	-0.04	- 1.8	-1.6	1.8	- 0.4	- 0.7	- 2.2	2.1
Southern Appalachian	102	155	199	0.0	- 0.4	11.7	1.4	0.1	2.5	- 5.3	- 7.3
Eastern Interior	226	244	271	0.02	- 3.4	-0.05	- 2.8	2.0	-12.0	- 8.2	10.5
Western Interior	115	224	266	-0.04	- 5.7	19.9	- 8.5	- 5.4	- 3.7	- 6.1	- 6.9
Texas	183	358	399	-0.6	-13.7	20.8	- 4.1	- 3.9	-27.5	-17.3	- 5.8
Powder River	46	69	73	0.09	14.5	42.7	7.3	1.3	22.3	13.9	- 5.8
Green River-Hams Fork	28	37	43	0.9	5.4	15.6	- 0.2	0.6	13.5	13.1	- 1.0
Fort Union	26	44	58	0.0	- 2.7	3.8	- 0.6	0.6	2.4	-12.0	2.0
San Juan River	6	11	16	0.1	- 2.3	0.5	- 1.1	- 0.3	0.2	- 0.8	0.9
Uinta-Southwestern Utah	14	14	19	0.4	- 0.2	- .7	- 0.8	- 0.6	0.5	- 1.4	- 4.4
Denver-Raton Mesa	21	28	33	0.06	0.4	2.6	- 0.4	- 0.4	1.5	0.1	- 1.3

regions. In 1990, medium level coal production under the preferred program would result in a lower loss in primary production in comparison to the no new leasing alternative in all regions except the Northern Appalachian, Powder River, Green River-Hams Fork, and Denver-Raton Mesa Coal Regions. The largest increase would be a 23 percent higher loss in the Powder River Coal Region; the Fort Union Coal Region would lose about 17 percent more primary production of biomass.

Comparison of the lease PRLAs only and the no new leasing alternatives at the medium production levels in 1985 indicates that lower primary productivity under the lease PLRAs only alternative would occur in the West except in the Powder River and San Juan River Coal Regions; losses in the East would be consistently lower. In 1990, all regions except the Central and Southern Appalachian and Powder River Coal Regions would experience lower losses in productivity than under the no new leasing alternative; the loss in the Powder River Coal Region would be about 12 percent higher.

Under the emergency leasing alternative in 1985, moderate increases in productivity lost would result in the western coal regions compared to the no new leasing alternative. In 1990, losses in productivity would be lower or would increase only slightly above those which would result under the no new leasing alternative.

The leasing to meet industry needs alternative would generally remove slightly less natural productivity (on a percentage basis) in the East and considerably more in the West during both time periods. The lease to meet DOE production goals alternative would cause considerably higher losses in some of the western regions.

Under the state determination of leasing levels alternative at the medium coal production projection, a general amelioration of the western impacts would occur when compared to the lease to meet industry needs or lease to meet DOE production goals alternatives. In the near term, this alternative, however, would create higher losses in the Fort Union and Green River-Hams Fork Coal Regions than those which would occur under the no new leasing alternative. Over the long term, no significant differences would be noticed.

5.3.3.2 Habitat Losses.

Habitat losses are dependent on the amount of land disturbed during program-related coal development activities. The degree of surface mining in a given region would be a major factor contributing to habitat loss. Land for community expansion, rights-of-way, and conversion and consumption plants would also reduce habitat.

Surface mining disturbances typically clear a land tract of vegetation and remove the area of overburden. The removal of vegetation with soils causes a loss of food, cover, and breeding sites for resident wildlife populations, as well as livestock herds. This would ultimately result in net reductions of these populations in the affected coal regions. Cattle and sheep herds would be removed from western grazing lands or eastern pasturelands, where surface mining occurs. Populations of burrowing mammals, ground nesting birds, reptiles, and soil organisms would be reduced by the elimination of both individuals and habitat due to coal-related excavation. More mobile wildlife, such as deer, songbirds, and predators, would flee to the surrounding areas, where they would create additional interspecific competition for food, cover, and nesting sites. Where such competition is at a maximum, but the existing wildlife can still be supported, the habitat is said to be at its carrying capacity. If habitats in surrounding areas are already at their carrying capacities, which is generally the case with a stabilized ecosystem, the habitat will not be able to sustain any long-term population increases. Thus, in addition to losses on lands directly disturbed, wildlife would also be subject to losses on other lands which already support populations at the carrying capacity. Table 5-63 presents estimates of potential big game population reductions which would occur due to habitat loss as a result of the no new Federal leasing alternative at low, medium, and high production projections. Table 5-63 also presents a comparison of potential big game population reductions of the no new Federal leasing versus other program management alternatives. Carrying capacity information for typical types of wildlife common to the 12 coal regions is given in Table D-1 of Appendix D. In addition, Appendix D provides estimates of potential wildlife losses by region per alternative that would occur as a result of habitat losses.

5.3.3.3 Endangered Species. Endangered and threatened species and their habitat are protected under the Endangered Species Act of 1973 for their aesthetic, ecological, historical, recreational, and scientific value. Regardless of which coal management alternative is adopted, any site selected for mining would require specific analysis to determine the presence of protected species or their habitat. If it is determined that such species or habitat does occur, the surface area may be designated as unsuitable for coal mining under lands unsuitability criteria (see Sections 3.2.2 and Section 5.4.8). (The unsuitability criteria proposed in the preferred program (see Table 3-1) would also protect threatened species designated under the 1973 Act and state listed threatened or endangered species).

Table 5-64 provides a summary list of endangered species found within the coal regions together with the developments that most severely threaten their continued existence. Included in this listing are animal and plant species with formal endangered or threatened status as identified by the U.S. Fish and Wildlife Service's List of Endangered and Threatened Wildlife and Plants, January 17, 1979. Of the 22 plant species which have been formally accepted as endangered or threatened, only four (Texas wild rice, northern wild monkshood, Rydberg milk-vetch, and *Phacelia argillacea)* have been reported to occur in the coal regions. Proposed listings of plants such as the Smithsonian listing of 1975 are not included. The "Distribution" column lists general drainages or states where the species occur. Where the species occurs in several regions, these species are discussed once in the region most commonly inhabited. The major types of developments which adversely impact these species are listed in the "Most Serious Threat" column. However, as all new construction and mining would affect habitats, these also must be considered in planning for coal related development.

Guidelines for Section 7 of the Endangered Species Act of 1973 were issued to all Federal agencies by the U.S. Fish and Wildlife Service on April 22, 1976. On January 4, 1978 in 43 Federal Register 870, the U.S. Fish and Wildlife Service issued final rules establishing the procedures governing interagency consultation under Section 7 of the Endangered Species Act of 1973. Accordingly, before the Bureau of Land Management would consider a new coal lease, it would consult with the Fish and Wildlife Service regarding potential impacts to endangered species or their habitats.

The following is a brief discussion, by region, of potential impacts on Federal endangered species. The main problem in the future regarding actions at specific sites would be determination of whether or not an endangered species (either as a resident or an occasional migrant) or its habitat is present. Appendix Table D-3 lists the number of species by major category (i.e., mammals, birds, etc.) which occur on the state listings of protected species. Site specific information would also be required to determine their presence.

Northern Appalachian Coal Region. While Appendix D lists 26 species of endangered animals for the Appalachian Coal Region, few are actually permanent residents in the Northern Appalachian Coal Region. Much of this region is man-dominated and many species have already been eliminated. Reintroduction of the peregrine falcon is occurring in the Northeast, and it is possible that it could eventually spread to this region. Nesting habitat which could be provided by rock outcrops and cliffs would be impacted by mining in the Northern Appalachian Coal Region. However, released birds are known to nest on man-made structures.

The gray and Indiana bats may be found in limestone caves, which could be affected by mining that removed the caves or impaired entrances. An occasional eastern cougar could be found in remote mountain areas. Because of the large territories established by this predator, any reduction of habitat either by mining, urbanization, or other conjunctive development would threaten the cougar.

No endangered plant species occur in the Northern Appalachian Coal Region.

Central Appalachian Coal Region. The statements for the Northern Appalachian Coal Region also apply to the Central Appalachian Coal Region. Since the Central Appalachian Coal Region is more remote, the potential for impacts to cougars and bald eagles would increase. As mountain tracts are stripped or opened to urbanization, these species might disappear. The gray and Indiana bat are less rare in Central Appalachia.

TABLE 5-63

COMPARISON OF GAME ANIMAL LOSSES

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	1,846	1,811	1,870	0	0	- 5	-50	-51	-51	- 1	-52
Central Appalachian	1,030	1,060	1,033	0	-8	-17	- 3	- 5	-44	- 9	13
Southern Appalachian	781	1,071	1,118	0	-27	- 4	-17	-15	0	-50	-34
Eastern Interior	1,563	1,578	1,555	0	8	-15	- 3	0	-12	-39	6
Western Interior	398	492	504	0	-21	33	-26	-23	-30	0	72
Texas	1,026	1,427	1,359	0	16	-111	-10	- 2	-80	-34	93
Powder River	274	341	442	0	0	34	0	0	27	-10	27
Green River-Hams Fork	101	165	205	0	8	49	4	13	61	60	-27
Fort Union	149	178	317	12	12	2	12	12	30	-21	33
San Juan River	4	5	8	0	0	0	0	0	1	1	1
Uinta-Southwestern Utah	26	28	32	4	1	1	1	1	2	1	1
Denver-Raton Mesa	34	46	56	0	2	2	2	2	8	12	2
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	1,711	1,969	2,856	1	2	41	- 1	0	- 4	8	12
Central Appalachian	1,086	1,306	1,480	1	-13	-11	14	2	- 5	-10	15
Southern Appalachian	750	1,142	1,464	0	- 4	86	10	1	18	-39	-54
Eastern Interior	1,575	1,704	1,893	0	-22	0	18	-13	-76	-52	66
Western Interior	402	616	927	0	-20	-70	-29	- 3	-13	-21	-24
Texas	1,291	2,621	2,921	7	-158	-240	-48	-45	-317	-200	-67
Powder River	342	506	535	0	118	345	60	12	22	114	46
Green River-Hams Fork	151	191	226	5	33	95	- 2	4	82	81	-63
Fort Union	216	361	478	0	21	28	- 5	4	17	- 93	14
San Juan River	6	10	15	0	- 1	0	0	0	0	0	1
Uinta-Southwestern Utah	35	35	45	0	- 1	2	-14	- 2	0	1	- 2
Denver-Raton Mesa	54	72	82	0	0	8	2	- 2	4	0	- 4

TABLE 5-64

POTENTIAL THREATS TO ENDANGERED SPECIES OF COAL REGION

Common Name	Scientific Name	Distribution	Habitat	Most Serious Threat
FISHES				
Woundfin	Plagopterus argentissimus	Virgin River below Hurricane, Utah	swift rivers	reservoirs
Greenback cutthroat trout	Salmo clarki stomias	Blackhollow Creek Cache la Poudre River, few possible streams in Boulder & Larimer counties, Colorado	fresh, cold streams & rivers	reservoirs
Arizona (apache) trout	Salmo apache	Arizona	streams	reservoirs
Humpback chub	Gila cypha	Green & Colorado Rivers, from Grand Canyon Area Northward to vicinity of Flaming Gorge Dam on Utah-Wyoming border	flowing streams & rivers	reservoirs
Colorado squawfish	Ptychocheilus lucius	middle and lower Green River, main Colorado River above Lake Powell, and Salt River; spawning in Yampa and and Green River	turbid, swift warm rivers	reservoirs
Kendall Warm Springs dace	Rhinicthys osculus thermalis	Kendall Warm Springs, tributary to the Green River in Wyoming	warm springs fed streams	reservoirs
Fountain darter	Etheostoma fonticola	Comal & San Marcos Springs in Hays and Comal Counties Texas	spring outflow	habitat change
Watercress darter	Etheostoma nuchale	Glen Springs at Bessemer, Jefferson County, Alabama (Black Warrior River drainage)	springs with watercress	habitat change
HERPTILES				
Texas blind salamander	Typhlomolge rathbuni	Hays County Texas	deep wells, underground streams	probably none
Houston toad	Bufo houstonensis	southcentral Texas	loblolly pine forests	habitat loss
American Alligator	Alligator mississippiensis	North Carolina, South to Texas, Florida, Louisiana, Georgia, Arkansas, Southeast Oklahoma	fresh wetlands, salty estuaries	habitat loss
BIRDS				
Eskimo curlew	Numenius borealis	Alaska, migratory through Central U.S.	grasslands and tundra	habitat loss

TABLE 5-64 (continued)

Common Name	Scientific Name	Distribution	Habitat	Most Serious Threat
Whooping crane	Grus americana	winters on Gulf Coast, Texas; migrates through westcentral U.S. from Canada to Texas	wetlands, coast, grain farmlands	probably none
Attwater's greater prairie chicken	Tympanuchus cupido attwateri	coastal prairie counties, Texas (primarily Refugio and Colorado Counties)	prairie, grasslands	habitat loss
Artic peregrine falcon	Falco peregrinus tundrius	migrates through eastern and middle North America to Gulf	breeds in treeless tundra; migrates along coasts and waterways, feeds in marshes	habitat and wetland removal
American peregrine	Falco peregrinus anatum	breeds Alaska south to Baja Calif., Arizona to Rocky Mts. (most western states)	coniferous forests and wetlands and along rivers	habitat and wetland removal
Bald eagle	Haliaeetus leucocephalus	Atlantic & Gulf coasts, resident of Florida, may be found all over U.S. wandering	wetlands, cliffs, forests, estuaries, freshwater lakes	transmission lines, habitat removal
Red-cockaded woodpecker	Picoides borealis	Oklahoma, Arkansas, Kentucky, Virginia-South to Gulf of Florida	mature pine forests	habitat removal
Ivory-billed woodpecker	Campehilus p. principalis	Texas, Louisiana	mature hardwoods	habitat removal
Bachman's warbler	Vermivora backmanii	Virginia, South Carolina, Alabama	swamp forests bottomlands	habitat removal
Thick-billed parrot	Rhynchopsitta pachyrhyncha	Arizona & New Mexico	mountains	probably none
Kirtland's warbler	Dendroica kirtlandii	breeding area--lower Michigan, migrates south to Bahamas	Jack pines brushy undergrowth	probably none
MAMMALS				
Gray bat	Myotis grisenscens	central, southeastern, midwestern, and eastern states.	limestone caves	habitat loss
Indiana bat	Myotis sodalis	central and southeastern states	limestone caves	habitat loss

TABLE 5-64 (continued)

Common Name	Scientific Name	Distribution	Habitat	Most Serious Threat
Black-footed ferret	Mustela nigripes	Western United States and Canada	shortgrass prairie	habitat loss
Utah prairie dog	Cynomys parvidens	Utah	grassland & cropland	habitat loss
Eastern cougar	Felis concolor cougar	Eastern United States (Canada to Carolinas)	remote woodlands and mountains	community expansion
Red wolf	Canis rufus	Texas, Louisiana (Gulf regions)	coastal prairie marshes, swamplands	community expansion
Gray wolf	Canis lupus	Texas, New Mexico, Mexico, Wyoming, Montana, South Dakota (Black Hills), Idaho, Oregon and Washington	remote arid prairies; remote mountain regions & open lands & forests	community expansion
CLAMS				
Birdwing pearly mussel	Conradilla caelata	Powell & Clinch Rivers in Virginia and Tennessee; Duck River in Tennessee	river	reservoirs
Dromedary pearly mussell	Dromus dromas	Powell & Clinch Rivers in Virginia and Tennessee	river	reservoirs
Green-blossom pearly mussel	Epioblasma torulosa gubernaculum	Clinch River in Virginia and Tennessee	river	reservoirs
Tuberculed-blossom pearly mussel	Epioblasma torulosa torulosa	Lower Ohio River in Kentucky and Illinois, Nolichucky River in Tennessee and Kanawha River in West Virginia	river	acid drainage, reservoirs
Fine-rayed pigtoe pearly mussel	Fusconaia cuneolus	Clinch River in Virginia and Tennessee, Powell River in Virginia and Tennessee, and Paint Rock River in northern Alabama	river	reservoirs
Shiny pigtoe pearly mussel	Fusconaia edgariana	Powell and Clinch Rivers in Virginia and Tennessee, Paint Rock River in Alabama and Holston River in Virginia	river	reservoirs

TABLE 5-64 (concluded)

Common Name	Scientific Name	Distribution	Habitat	Most Serious Threat
Pink mucket pearly mussel	Lampsilis orbiculata orbiculata	Green River, Kentucky Kanawha River in West Virginia, Tennessee River (Tennessee and Alabama); Muskingum River, Ohio	river	acid drainage, reservoirs
Alabama lamp pearly mussel	Lampsilis virescens	Paint Rock River System in Alabama	river	reservoirs
White warty-back pearly mussel	Plethobasis cicatricosus	Tennessee River in Tennessee and Alabama	river	reservoirs
Orange-footed pearly mussel	Plethobasis cooperianus	Tennessee River in Tennessee and Alabama, Duck River in Tennessee	river	reservoirs
Rough pigtoe pearly mussel	Pleurobema plenum	Tennessee River, Tennessee, Green River, Kentucky; Clinch River, Virginia and Tennessee	river	acid drainage, reservoirs
Cumberland monkey-face pearly mussel	Quadrula intermedia	Powell and Clinch Rivers in Virginia and Tennessee Duck River, Tennessee	river	reservoirs
Appalachian monkeyface pearly mussel	Quadrula sparsa	Powell and Clinch Rivers in Virginia and Tennessee; Duck River, Tennessee	river	reservoirs
Pale lilliput pearly mussel	Toxolasma cylindrella	Duck river, Tennessee; Paint Rock River, Alabama	river	reservoirs
Cumberland bean pearly mussel	Villosa trabilia	Cumberland and Rockcastle Rivers, Kentucky	river	acid drainage, reservoirs
Yellow-blossom pearly mussel	Epioblasma florentina florentina	Duck River, Tennessee	river	acid drainage, reservoirs
Turgid-blossom pearly mussel	Epioblasma turgidula	Duck River, Tennessee	river	acid drainage, reservoirs
Endangered Plants				
Texas wild rice	Zizania texana	San Marcos River, Texas	warm spring-fed waters	habitat loss
Rydberg milk-vetch	Astragalus perianus	Utah	grasslands	habitat loss
Northern wild monkshood	Aconitum noveboracense	Iowa	moist woodlands	habitat loss
Unnamed phacelia	Phacelia argillacea	Utah	wetlands	habitat loss

The rivers of the Central Appalachian Coal Region support 16 endangered mussels. These species could be threatened by mining which adds acid mine drainage or sediment to regional streams. In addition, reservoirs which change river habitat to lake habitat would eliminate some populations. The species residing in the following rivers would be most impacted by coal developments and industrialization: Powell, Clinch, Duck, Lower Ohio, Nolichucky, Kanawha, Holston, Muskingum, Green, Tennessee, Cumberland, and Rockcastle Rivers.

No endangered or threatened plant species are known to occur in this coal region.

Southern Applalachian Coal Region. Three endangered bird species are found in the Southern Appalachian Coal Region. The bald eagle nests there, as well as the red-cockaded woodpecker and Bachman's warbler. All of these species are found in other southern states where coal development would not occur, so extinction would not occur if the habitats in this coal region were removed.

Conjunctive developments, such as roads, pipelines, plant construction, and urbanization, and sediment from land clearing, could reduce watercress darter populations. If Glenn Springs (Jefferson County, Alabama) were to be affected drastically as well, this species could become extinct.

The Paint Rock and lower Tennessee River systems support seven endangered clams. Sediment and reservoirs would reduce certain populations of these mussels.

No endangered or threatened plant species are known to occur in this coal region.

Eastern Interior Coal Region. At least eight species of endangered animals are found in the Eastern Interior Coal Region. Few of these are permanent residents. The peregrine falcon migrates through this coal region along waterways. Bald eagles are found along the Mississippi River. The gray and Indiana bats are residents of limestone cave areas, which could be adversely affected by mining. Modification of caves would eliminate critical habitat.

Two endangered species of mussels which are distributed in Eastern Interior Coal Region rivers would be affected by acid mine drainage and sedimentation.

No endangered or threatened plant species are known to occur in this coal region.

Western Interior Coal Region. At least 10 endangered animal species are found within this region, and many more are unique to the Ozarks. Bald eagles, whooping cranes, peregrine falcons, eskimo curlews, and Bachman's warblers are all migrants of this region. The red-cockaded woodpecker is a probable permanent resident in mature pine forests, particularly where suitable cavity trees exist (generally overmature pines infected with red heart disease). While development would not likely eliminate the species, population within this region would be reduced where development removed these forests.

Northern wild monkshood (a threatened plant) occurs in moist woodlands in Iowa, and would be adversely affected if coal development removed or encroached on its habitat.

Texas Coal Region. The Texas Coal Region provides habitat for 12 endangered species. The fountain darter in Hays and Comal Counties, Texas, could be affected by water withdrawals and water disturbances due to developments associated with coal production. If Comal and San Marcos Springs were to be eliminated, the fountain darter could become extinct.

The Houston toad could be eliminated from central Texas if pine forest were cleared and surface mined. The ivory-billed woodpecker may occur in mature bottomlands such as the Big Thicket. This bird and the red wolf would be affected if remote woodlands were altered.

Wetlands for the whooping crane are well protected. Drier prairie sites, which could be used for coal conversion and utilization plant sites or for strip mining, provide habitat for Attwater's greater prairie chicken.

The San Marcos River provides habitat for Texas wild rice. Water withdrawals, sedimentation, and water pollution would adversely affect this plant species.

Powder River Coal Region. At least four endangered species occur in this region. The whooping crane, bald eagle, and American peregrine falcon are all migrants of the region. Wherever prairie dog towns and resident black-footed ferrets are found, surface mining, industrial development,

or urbanization would lower or possibly cause loss of the ferret population.

No endangered or threatened plant species are known to occur in this coal region.

Green River-Hams Fork Coal Region. At least six endangered animal species are present in this coal region. The Kendall Warm Springs dace occurs in Kendall Warm Springs Creek, a tributary of the Green River. The black-footed ferret occurs in the Green River - Hams Fork Coal Region. As prairies are surface-mined and communities expand into remote areas, animal numbers would be reduced.

No endangered or threatened plant species are known to occur in this coal region.

Fort Union Coal Region. In addition to species mentioned for the Powder River Coal Region, the Tule white-fronted goose is a potential migrant into the Fort Union Coal Region. This species would be impacted if development adversely affected critical lake or wetland habitats. The northern kit fox is an occasional wanderer into the region from Canada.

No endangered or threatened plant species are known to occur in this coal region.

San Juan River Coal Region. In this coal region, the Arizona (Apache) trout would be affected by any water development, water withdrawals, reservoirs, or water pollution. The American peregrine falcon is more dependent upon upland habitats which could be strip mined or subject to urbanization. The thick-billed parrot would probably remain unaffected by coal development since it exists principally south of the coal fields.

No endangered or threatened plant species are known to occur in this coal region.

Uinta-Southwestern Utah Coal Region. This region has at least 10 threatened or endangered species. The woundfin, humpback chub, and Colorado squawfish are all associated with flowing river habitat and would be affected by reservoir construction, mining pollution, and water withdrawal.

Rydberg milk-vetch (a threatened plant) and *Phacelia argillacea* (an endangered species of the waterleaf family) would be adversely affected by strip mining, urbanization, and other land clearing activities.

Nesting areas for golden eagles and winter roosting concentration areas for bald eagles would also be potentially affected.

Denver-Raton Mesa Coal Region. At least five endangered species occur in this region. Whooping cranes, peregrine falcons, and bald eagles are migrants through the region. The black-footed ferret would be affected where strip mining and urbanization removed habitat or reduced prairie dog populations. A small population of the greenback cutthroat trout also remains within this coal region.

No endangered or threatened plant species are known from this coal region.

5.3.4 Socioeconomic Impacts

The purpose of this section is to assess socioeconomic impacts which are likely to occur within each coal production region due to production activities under a Federal coal management program. Community impacts can be anticipated within broad geographic areas by quantitative analysis of inter-regional population changes induced by coal-related activities. Program decisions would have consequences for:

- Population and lifestyle
- Employment opportunities
- Agricultural productivity
- Public services and community fiscal stability
- Tax revenue time lag
- Coal development cycle accidents and fatalities
- Cultural resources
- Recreation resources

The following section reviews what can be determined for each of these areas of impact using regional data. The location and intensity of impacts with respect to specific communities is dependent upon the form taken by the Federal coal management program which is finally adopted.

One purpose of the Federal coal program is to delineate tracts, if necessary, for coal leasing. The size and location of these tracts will be determined under an approved program through a land-use planning process, by application of suitability criteria after consultation with state and local government, industry, and the public. In the future, after tracts have been delineated, the

impacts associated with leasing and mining will be the subject of intra-regional impact assessments. Decisions on the tracts and on regional assessments will not be made until after adoption of a Federal coal management program. The regional assessments will include:

- Cumulative site-specific analysis of all impacts for each tract within a given region.
- Site-specific urban impact analysis and assessment of effects on rural and community development. A special situation may exist in some western localities where population increases occur adjacent to Indian communities in which English is not spoken and traditional life styles of the inhabitants predominate. The problem of expanding educational facilities would be complicated, particularly because of the linguistic difference and because children of the newcomers would have different school needs from those of the native pupils. The situation would be the reverse of that encountered in other parts of the country, where it has been necessary to establish bilingual instruction to serve non-English speaking groups that move in. As means have been found to meet the educational needs in this latter situation, it can be assumed that satisfactory provision will also be made in communities where children of both Indian and non-Indian parents will require instruction.

The difficulties inherent in a potential conflict of traditional and transplanted lifestyles are more difficult to predict, however, both as to the form they will take and as to the means that could prevent or mitigate them. The problems discussed above in regard to impacts on existing social patterns could be aggravated by the language barrier to communications. As a minimum, careful advanced planning will be required, initiated by state and local government authority and supported by the industry involved. Within this planning framework, it will be essential for leaders of both existing and incoming elements of the community to hold a continuing series of meetings with a view to anticipating and averting potential problems, providing the necessary expanded or additional community services, and establishing the mutual cooperation necessary for different lifestyles to exist harmoniously in close contact.

5.3.4.1 Population. Socioeconomic impacts are addressed in this section by analyzing the relationships between population changes that might be stimulated by coal management decisions and the baseline population data presented in the regional descriptions in Chapter 4. Population change is emphasized because it is one of the most important indicators of other kinds of change which often result in social and economic problems in communities affected by sudden increases or decreases in coal production. The Department recognizes that the real impacts of Federal coal management decisions are felt directly by individuals and families. It also recognizes that some impacts are easier to measure than others. The change from a stable rural environment to a more diverse and unpredictable setting, which combines both rural and urban activity, creates losses for some individuals which are real but difficult to quantify. Such changes may also intensify social tensions, such as those between Indians and non-Indians where coal development occurs near Indian reservations and between the resident ranchers and farmers and the new families attracted by the coal development employment opportunities. These losses and tensions are also the least likely to be avoided or minimized through mitigation efforts.

Quantitative analysis can help predict the needs for housing, education, health care, utilities, public safety, recreational facilities, and other services and facilities required to assure that a population of a certain size can be accomodated in a specific area without causing overcrowded schools, inadequate health care, substandard living conditions from housing shortages, or similar problems. The cost of providing facilities and services can also be measured. This means that by analyzing the probable population impacts of the Federal coal management alternatives, the state and local governments in impacted regions can work with local citizens, Federal agencies, and the coal industry to determine what kinds of facilities and services will be needed, where such facilities and services should be located, when they are needed, and who should pay for them.

Where data in this section indicate large population changes or rapid population growth rates, social and economic problems would likely result unless corrective actions are planned in advance by responsible state and local governments. The possible impacts of such changes can

be further measured by comparing the socioeconomic data in Appendix G with the regional descriptions in Chapter 4. The comparison will illustrate the range of facility and service demands which could be generated by population changes.

Population changes might occur in any of several specific locations within a broad geographic area, and regional data can not be used to predict impacts on an individual community or locale. Only a more project-specific and site-specific analysis could provide information of meaningful value to local planners. The impact of rapid increases in coal-related employment will also vary greatly from community to community, depending on the level of existing services and facilities in specific areas. A given amount or rate of coal development-induced demand for services would have one effect in an area that is already relatively industrialized as compared to the impact of introducing the same demand in a predominantly agricultural area. For this reason, increases in demand for specific facilities and services can not necessarily be considered as an economic threat, or an economic benefit, without more specific analysis of local conditions and capabilities. It should be noted in those areas with high rates of unemployment, such as Indian reservations, energy development will have both positive and negative effects. As noted above, the probability of social and cultural conflicts is high. Further, seemingly impossible demands upon existing infrastructures will strain the ability of local communities to deliver essential services. Positive effects will include substantial increases in the demand for labor, and, over time, generation of significant levels of public revenues derived from energy resources.

In general, social and economic change can be projected to have different impacts, requiring consideration of different mitigation measures, in three broad categories of impacted communities. In areas that have previously experienced industrial development, and that have both private and public facilities and services in place to support an existing urban or industrial population, an increase in mining and related activities may lead to increased occupancy of existing housing, increased employment among existing local or area workers, higher enrollment in existing schools, and corresponding increases in the use of other facilities and services. Population changes resulting from the increased activities, in terms of both the absolute numbers and the numbers relative to the community's existing population, may be minimal. Where changes would take place, local and state government agencies with existing budgets and staffs designed to deal with social services, planning, and land use can address the population-related problems; in these cases, the need to increase the size and complexity of local government might be minimal.

However, where neither the private economy nor local governments have previously been required to respond to needs created by relatively large numbers of industrial workers, the changes required may seriously conflict with existing patterns of residential and commercial development, transportation systems, and priorities for government activity and spending. Some problems would be physical and financial, others more social and political.

Housing shortages could be severe, resulting in the rapid establishment of mobile home parks in areas with inadequate zoning regulations. This development often leads to haphazard growth, substandard living conditions, and a general deterioration of the social structure. In more severe situations, there could be an increase in violent and property crimes, alcoholism, prostitution, and drug abuse. Lack of a full array of recreational, education, social services, and cultural opportunities for personal enrichment might become evident. A sharp increase in demand for building sites, construction materials, and other goods and services could cause serious local inflation. New employees in coal development-related industries would usually be more highly paid than the established residents who work in other enterprises, with the result that people who have lived in a community for years may find themselves paying more to live, without a commensurate increase in personal income. The need to decide where to develop new housing, to protect community health and safety by building new sewage treatment plants and hiring more police and fire employees, and to build new schools and employ more teachers could put strains and pressures on the resources of a small community. Divisive political struggles for control of local government and the feeling of loss of community control could develop.

Long term planning problems are also likely in the public sector. Demand for public facilities and services would rise rapidly once development began. The need to find public funds to pay for roads, sewers, schools, and other government services might also increase the tax burden for all local residents, particularly where tax collections from the new industry and its workers would not bring in new revenues fast enough to finance the new services and facilities needed. Repair and maintenance costs for old facilities would also increase. For example, increased use of public roads by mining or industrial equipment would shorten repair and maintenance intervals.

A municipal or county government which has not previously had to address such questions may be forced to consider substantial changes in budget, structure, and priorities. In summary, the process of considering serious changes in the size, cost, and authority of local government may cause considerable social and political conflict within a community.

The third category of impacted communities includes those areas so far removed from existing communities that, with the exception of often unsurfaced rural roads and occasional general stores, only the most minimal commercial or government facilities and services exist. Residents make infrequent trips to distant urban centers for most supplies and materials. Medical care, commercial entertainment, and other services available only in larger communities are equally distant. Self-reliance and interdependence among neighboring families establish community relationships which provide cooperative approaches to dealing with common problems. Rather than feeling isolated or deprived, many residents of such rural areas are satisfied with the quality of their lives and feel threatened by changes that would result from the introduction of mining and industrial development in their areas. Others who welcome employment and other economic opportunities that could be generated by coal development retain, at the same time, a strong interest in maintaining what they consider to be the benefits of life in a rural, agricultureal area. Few residents of these rural areas, even among that segment of the population which favors coal development, want development to take place in a manner which would seriously disrupt traditional community values and patterns. On Indian reservations these feelings are augmented by the desire to maintain unique cultural values.

Introduction of coal development-induced populations into such areas would have significant social and economic consequences. The goal of maintaining a physical and social environment consistent with tradition or culture would not be realistic. Residents who cherish this way of life would be forced to tolerate changes. At the same time, because there are few existing financial and institutional committments to housing, transportation, and government services, these facilities and services could be designed and installed without causing the conflicts and disruption which could result from trying to match the new needs to existing private and public support existing in an established community. The benefit of being able to avoid such temporary social and financial conflict by locating new communities in undeveloped areas may be offset, however, by the higher economic costs of building a complete new community in a remote and undeveloped area.

Basically, the degree of impact in any region would be directly related to the incremental growth of the area. Communities in semirural areas could generally absorb a five percent annual growth rate without experiencing severe strain. However, rapid urban growth or "hyperurbanization" could occur if average annual increases approached the seven to 10 percent range, i.e., boom-town development. Population growth rates above 10 percent would require detailed advance planning and possible considerations of new town designs. If growth rates exceed the hyperurbanization levels, (i.e., were much above 10 percent), many of the impacts discussed above would likely intensify. Quantification of population change in the following discussion should, therefore, be related to these ranges of growth. It should be noted, however, that the following analysis assumes that total population would grow at a constant rate. It does not reflect the specific variations between types of coal related activities nor does it reflect short-term growth fluctuations. For example, the different impacts which would result from the rapid rise and fall of a labor force required for the construction of a steam electric power plant as opposed to the long-term build-up of operational-related populations are not addressed separately. The total population discussed in the remainder of this section is derived from

both the construction and operational workers for all activities in the coal development cycle. The workers directly employed in coal development activities and their families are included as well as the indirect or service sector related population. The latter reflects the fact that additional goods and services required to meet the needs of the direct workers and their families will create new business opportunities, which attract additional people to the vicinity.

The total population related to the no new leasing alternative is presented in Table 5-65 for the low, medium, and high coal production projections. Data shown for 1985 represent the change in coal related population that could occur between 1976 and 1985. More specifically, it is the difference between the population which existed as a result of coal related activity in 1976 and the population related to coal production and consumption levels projected for 1985. It is this change in coal related population over time, compared to the regional baseline populations shown in Table 5-65, that provides the basis for addressing population growth rates and the significance of socioeconomic impacts. Similarly, the 1990 numbers represent coal related population changes that could take place between 1986 and 1990. The numbers do not necessarily mean that regional populations would increase or decrease by these magnitudes. The numbers are directly related to employment associated with coal development cycle increases and represent positions which might be filled by unemployed or underemployed workers within the region or new local entries into the labor market. In situations of this type, little if any population influx would occur. This is the probable case in Appalachian regions where coal related population increases would comprise a very small part of the total regional population base. Conversely, when these increases would be significantly greater than the baseline population, as in the Powder River Coal Region, considerable in-migration of workers and their families would be expected. While detailed socioeconomic impact analysis must be conducted on a more site-specific level, the relative magnitudes of the coal-related populations and regional baseline populations presented here are indicative of potential impacts at the regional level.

On this basis, socioeconomic impacts of the no new leasing alternative would be greatest in the Powder River Coal Region for the low, medium, and high production projections for both time periods. Population related to the 1985 production level would range from approximately 80,000 for the low projection to about 157,000 for the high projection (see Table 5-65). This represents 35 to 69 percent of the 1975 regional baseline population of about 228,000. Comparable numbers for the 1990 time period for the medium production projection are approximately 91,000, or about 40 percent of baseline. A total change of 89 percent over the 15-year period from 1975 to 1990 would result for the medium production projection.

Associated with these population data are comparable impacts on other socioeconomic characteristics as shown in Appendix G. For example, the 157,000 people at the 1985 high production projection in the Powder River Coal Region relate to approximately 35,000 public school children and 52,000 housing units. These compare to baseline figures of 54,000 enrollments and 82,000 year-round dwellings; this is about a 65 percent increase over baseline for the same time period. Also, while there were only an estimated 257 patient care physicians in the entire Powder River Coal Region in the base year, coal-related demand for doctors would reach approximately 160 at the 1985 high production projection. Requirements for 330 law enforcement officers compare to a base force of about 550.

It is apparent that coal related population in the Powder River Coal Region would reach levels at which rapid growth would be likely to occur during both time periods under the no new leasing alternative.

Although some of the absolute population figures shown in Table 5-65 would reach considerable levels in other regions under the no new leasing alternative, their relative magnitudes are much less significant when compared to baseline populations. The projected growth rate in the Green River-Hams Fork Coal Region in 1985, however, ranges from just under 20 to nearly 40 percent of the 1976 baseline. There are also significant differences between the program alternatives which cannot be analyzed quantitatively at this level of aggregation. For example, although the no new leasing alternative data may in some cases suggest lower levels of impact when compared to other alternatives, the distribution and timing of related population influx within the

TABLE 5-65

COAL RELATED POPULATION ASSOCIATED WITH NO NEW LEASING ALTERNATIVE
(thousands)

COAL REGION	1975 (a)	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985 (b)	1990 (c)	1985 (b)	1990 (c)	1985 (b)	1990 (c)
Northern Appalachian	8,019.5	123.6	-12.6	137.3	108.4	149.2	374.2
Central Appalachian	2,070.0	14.9	18.3	30.5	76.9	-6.8	193.4
Southern Appalachian	2,289.6	37.7	-2.2	88.0	26.7	116.7	87.4
Eastern Interior	5,191.7	176.2	158.8	185.0	263.6	157.3	392.7
Western Interior	5,883.1	65.8	16.2	99.8	150.4	106.1	216.5
Texas	2,526.6	121.8	57.2	182.3	259.4	176.7	328.1
Powder River	228.4	79.7	31.7	112.3	91.1	157.4	56.3
Green River-Hams Fork	126.9	21.1	25.1	45.4	24.0	58.6	19.4
Fort Union	324.4	14.7	21.8	22.4	60.2	51.8	51.9
San Juan River	351.1	5.9	18.6	12.8	44.3	30.3	59.2
Uinta-Southwestern Utah	406.6	21.2	22.3	42.2	37.1	66.0	49.4
Denver-Raton Mesa	1,854.2	16.0	23.9	25.6	38.7	36.1	37.4

(a) 1975 base case population from regional description in Chapter 4.
(b) Change in coal related population between 1976 and 1985.
(c) Change in coal related population between 1985 and 1990.

region could result in more severe problems that are not apparent in the numbers. Demand for coal would require significant levels of production and consumption even without additional Federal coal leasing. Leasing might encourage changes in the rate and location of this activity away from areas least capable of accommodating the development.

For example, under the no new leasing alternative, the future unavailability of new Federal coal would accelerate development of other coal reserves in a region. As a general proposition, a coal company develops its resources by choosing to mine the most profitable reserves it owns. The Federal government, on the other hand, directly and indirectly controls vast amounts of western coal reserves. In developing future regional production targets and in acting on mine plans for existing leases, the Department of the Interior has the ability to encourage the development of those reserves which best balance energy needs with other social, environmental, and economic values and objectives.

Another consideration is the degree to which the ability of local communities to react to infrastructure demands related to accelerated coal development is considered in future coal management decisions. The preferred program would include establishment of formal procedures for the exchange of information, concerns, and desires between the Department of the Interior and state and local agencies. The planning elements of the preferred program are also incorporated into the lease PRLAs only, emergency leasing, and lease to meet DOE production goals alternatives. While the extent of any new Federal leasing would vary among these alternatives, the ability to recognize and minimize associated economic dislocations could be assured. The state determination of leasing levels alternative would achieve similar results, but with many management responsibilities transferred from the Federal Government to the states.

Comparing the no new leasing alternative to the other six alternatives provides insight into the relative magnitude of expected impacts between alternatives. Data in Table 5-66 show the coal-related population increase related to the no new leasing alternative and compare the increases which would result under the other alternatives to that level. Positive numbers shown for the other alternatives indicate a higher level of coal-related population change than under the no new leasing alternative; negative numbers indicate a lower level.

The preferred program medium level in the Powder River Coal Region reflects a population change of approximately 71,000 over the no new leasing alternative by 1990. This amounts to an increase of about 162,000 people over the baseline population of 228,000 or an annual growth rate of approximately 14.2 percent. While adverse socioeconomic impacts would arise if there were no new leasing, they would be more severe under alternatives in which coal production in that region significantly increases.

There are also several other alternatives which suggest severe problems in the Powder River Coal Region under the 1990 projections. While the no new leasing alternative reflects an annual growth rate of about eight percent, the lease PRLAs only, lease to meet industry needs, and lease to meet DOE production goals alternatives would each stimulate growth above that level. These alternatives would result in annual population growth rates of approximately 11 percent, 16 percent, and 14 percent, respectively. Population changes related to these alternatives would be considerably higher than for the no new leasing alternative.

In summary, the Powder River Coal Region would experience the greatest socioeconomic impacts for the no new leasing alternative for both the 1985 and 1990 forecasts. These impacts would be even more severe in 1990 if production is increased to levels projected for the preferred programs, the lease PRLAs only, lease to meet industry needs, and lease to meet DOE production goals alternatives. Data indicate that population growth rates in the Powder River Coal Region would probably be excessive and result in too rapid urban development or "hyperurbanization"; the occurrence of the variety of adverse socioeconomic impacts discussed earlier would be likely. While growth rates in other regions appear to be within manageable levels, any concentration of population change in the more sparsely populated areas of the western regions would have the potential for similar adverse impacts.

5.3.4.2 Employment Impacts. The increased production and use of coal would create more jobs. The rate of increase in coal-related employment would depend on the level of total energy demand and

TABLE 5-66

COAL RELATED POPULATION, COMPARISON OF COAL MANAGEMENT ALTERNATIVES (thousands)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE (a)							
Northern Appalachian	123.6	137.6	149.2	-	-0.2	-1.0	-10.0	-10.0	-10.6	-0.2	-10.7
Central Appalachian	14.9	30.5	6.8	-0.1	-2.0	4.6	-0.3	-1.3	-18.1	-3.1	7.6
Southern Appalachian	37.7	88.0	11.7	-0.1	-4.2	-3.0	-3.6	-2.0	5.7	-13.9	-10.5
Eastern Interior	176.2	185.0	157.3	-0.1	3.9	-13.5	-0.7	0.7	-12.1	-8.0	7.5
Western Interior	65.8	99.8	106.1	-0.2	-5.9	10.3	-7.6	-6.5	-6.5	0.7	21.4
Texas	121.8	182.3	176.7	0.1	2.0	-14.0	-1.5	-0.4	-9.1	-4.1	11.9
Powder River	79.7	112.3	175.4	-	0.6	15.5	0.1	0.3	13.1	0.1	-11.7
Green River-Hams Fork	21.1	45.4	58.6	-	3.3	18.2	1.3	0.7	22.3	21.8	-9.8
Fort Union	14.7	22.4	51.8	2.6	2.7	0.7	2.8	2.8	7.0	-4.1	-7.0
San Juan River	5.9	12.8	30.3	-	0.2	0.3	-0.1	-0.1	3.4	-3.5	4.5
Uinta-Southwestern Utah	21.2	42.2	6.0	-	1.0	1.1	0.5	0.4	8.1	-3.8	0.4
Denver-Raton Mesa	16.0	25.6	36.1	-	1.2	0.8	1.1	1.1	3.0	5.0	2.1
	1990			CHANGE FROM NO NEW LEASING VALUE (a)							
Northern Appalachian	12.7	108.4	374.2	-8.4	2.0	-1.9	13.0	13.4	12.2	6.7	25.3
Central Appalachian	18.3	76.9	193.4	0.7	-5.4	-17.4	2.2	-0.3	8.6	-5.0	10.5
Southern Appalachian	-2.2	26.7	87.4	-0.4	3.7	17.3	6.7	3.1	4.9	-8.7	-17.4
Eastern Interior	158.8	263.6	392.7	-0.3	-22.2	-40.5	-27.2	-7.7	-57.6	-11.0	66.4
Western Interior	16.2	150.4	216.5	1.2	-0.5	-45.5	-2.9	1.0	1.6	-11.5	-0.1
Texas	57.2	259.4	328.1	-0.7	-26.4	-13.2	-7.4	-8.4	-37.0	-24.8	-28.8
Powder River	31.7	91.1	56.3	0.7	71.3	186.7	35.6	6.9	93.3	69.5	-11.4
Green River-Hams Fork	25.1	24.0	19.4	3.4	12.3	23.9	-1.6	0.3	10.7	10.0	-15.6
Fort Union	21.8	60.2	51.9	-3.6	-9.6	-7.7	-5.3	-2.8	-3.8	-20.2	-5.7
San Juan River	18.6	44.3	59.2	1.1	-7.0	-0.9	-2.7	-0.7	-2.8	-5.1	-2.4
Uinta-Southwestern Utah	22.3	37.1	49.4	2.1	-9.0	-5.7	-7.9	-2.6	-2.4	26.7	-13.2
Denver-Raton Mesa	23.9	38.7	37.4	1.0	-2.2	22.5	-2.5	-2.7	-6.0	-18.4	-6.7

(a) Represents change in coal related population between 1975 and 1985 and between 1985 and 1990.

the precentage of that demand supplied by coal-using facilities. Increases would be for jobs needed to mine, beneficiate (crush, grind, wash, and otherwise treat coal to make it usable), transport, and use coal.

Whether from surface or underground mining, increased coal production would result in significant new demands for labor. While all coal mining creates jobs, fewer jobs are created by surface mining than by underground mining, because the massive draglines and shovels used in surface mining require much less labor for each ton of coal recovered than do the smaller and relatively less productive machines used in underground mining. Although demand for labor would increase in all parts of the country where coal is mined, and the greatest growth rate in the coal mining industry is expected to take place in the western states (where coal mining now occurs at a relatively low level), the resultant increase in western demand for coal miners is not expected to cause a significant westward migration of mine workers. Increasing employment opportunities in eastern and midwestern mines, the high percentage of eastern miners trained in underground mining skills different from those required in those western surface mining regions experiencing high growth rates, and reluctance to give up established homes and living patterns in the East for difficult new living conditions in western coal "boom towns," would cause many eastern miners, even underemployed or unemployed mine workers, to remain in their established communities.

The principal source of labor for western coal production would be western workers in agriculture, and, to some degree, in the construction industry. Workers skilled in heavy equipment operation could easily transfer their skills to surface mining. Operators of small farms and ranches may supplement their incomes by working part time in the mining industry. It is expected that many agricultural workers would respond to the higher income opportunities created by coal mining, and so reduce the supply and increase the cost of agricultural labor. However, the severity of economic conflicts between the needs of agriculture and the needs of coal-related employers cannot be accurately predicted without more specific information about individual projects, rates of growth, and whether jobs are filled by local workers or by workers who have migrated into the region to seek employment in the coal industry.

Impacts of the high employment demands of coal-using facilities would vary according to the location of the power plants, gasification or liquefaction plants, and other facilities. For several reasons, it cannot be assumed that coal-based energy facilities would be located near the mines which supply them. Utilities which once planned to build mine-mouth power plants in the intermountain West to provide electricity for distant consumers are now considering other more advanced technologies. These could result in coal being transported by rail or slurry pipeline to conversion plants located in or near the major energy consumption centers. The relative scarcity of water in those western states with abundant coal supplies, and the desire of those states to ensure that their own industrial growth potential is not limited by pollution from plants which export power elsewhere, are stimulating more interest in techniques for converting coal in plants close to the industries and the consumers who use the coal-based energy. These factors and uncertainty about which new technologies and which coal feedstocks would be used in the manufacture of coal-based synthetic fuels mean that assumptions of national demand for those products cannot be translated into specific projections showing where the conversion plants and resulting employment demand would be located. Because of the specialized construction and operational skills required, it can be expected that to the degree conversion plants are located in remote rural areas or near communities without existing industrial workforces, significant interregional population movement would occur, as discussed in Section 5.3.4.1.

Because coal transportation systems are not labor intensive, the growth in employment required to transport coal would not be as dramatic as for the mining or use of coal. Overall numbers of coal transportation jobs are not likely to be changed by alternatives, although the selection of rail, slurry, or waterway transport could affect the location of job opportunities. A secondary consequence of transporting coal by truck, the need for significant increases in road repair, may create substantial localized demands for public works maintenance workers.

Projected employment increases in 1985 and 1990 under the no new leasing and other coal

management alternatives are presented in Tables 5-67 through 5-72 on the basis of employment type (construction or operation), and by major activity area of the coal development cycle (mining, beneficiation, conversion, or use).

Estimates for construction employment in the coal mining and beneficiation activity area are presented in Table 5-67 for the low, medium, and high production projections in 1985 and 1990 for the no new leasing alternative. Current (1976) coal-related employment is also presented. In 1985, employment in this component of the coal development cycle is projected to increase by 21 to 33 percent (low to high production projections) over 1976 levels. Major increases in the eastern regions are projected to occur in the Eastern Interior Coal Region (26 to 41 percent increase over 1976 levels) and in the Texas Coal Region (108 to 156 percent increase over 1976 levels). In the western regions, a substantial increase in construction employment is projected in the Powder River Coal Region for all production levels. Medium and high production projections would cause substantial construction employment increases in the Green River-Hams Fork Coal Region (85 to 123 percent), San Juan River Coal Region (82 to 158 percent), and Uinta-Southwestern Utah Coal Region (84 to 149 percent).

By 1990, the high growth rates observed in the earlier periods would generally decrease. Western coal mine and beneficiation plant construction is projected to provide an additional 21,000 to 42,000 jobs over the number estimated for 1985. This represents a national increase in construction employment in the mining and beneficiation sector of approximately 10 percent. The primary reason for the decline in the demand for construction workers is that the rate of growth of coal production would be generally higher between 1976 and 1985 than it would be between 1986 and 1990. By 1990, western coal demand would reach high levels but the relative increases would be small.

Projected levels of construction employment in the mining and beneficiation sector for all other program alternatives are presented in Table 5-68. In 1985, major variations from employment levels for the no new leasing alternative are projected in the Eastern Interior, Powder River, Green River-Hams Fork, and San Juan River Coal Regions. By 1990, major changes from the no new leasing alternative are predicted for several alternatives. For the Powder River Coal Region, a decrease is projected under the state determination of leasing levels alternative. In all other other alternatives, increases are estimated for this region which ranges from a low of 2,889 (about four percent) under emergency leasing to a high of about 38,000 (nearly 49 percent) for the leasing to meet industry needs alternative. These increases are at the medium level of production. Under the projection of high coal production, the increase in the Powder River Coal Region would exceed 80 percent of the corresponding baseline employment estimate. The Green River - Hams Fork Coal Region would also experience significant increases over the no new leasing alternative of from 5,452 to 12,965 (from about 20 to 50 percent) under the preferred program, and under the alternatives of lease to meet industry needs, and lease to meet DOE production goals. In other western regions, employment in 1990 is projected under other alternatives to be less than that estimated for the no new lease alternative or to show relative increases well under 10 percent. Projected relative decreases are especially striking for the Texas Coal Region, where employment under the lease to meet industry needs alternative would be less than half that estimated for the baseline level of employment.

One of the largest increments in actual numbers (19,514) is projected for the Eastern Interior Coal Region under the state determination of leasing levels alternatives. This increase represents over 15 percent of the baseline employment level. This alternative is also associated with an increment in the Western Interior Coal Region which is about one-third of the employment projected with no new leasing. Under most alternatives, employment in the East would in 1990 show little change from the baseline or would decrease relative to it. These relative decreases may exceed 45 percent for the Southern Appalachian Coal Region and 59 percent in the Western Interior Coal Region, both regions where comparatively small amounts of coal are projected to be mined.

Employment projections for the operation of coal mining and beneficiation facilities are presented in Table 5-69. The data indicate the additional employment (in excess of 1976 baseline estimates) projected under the various no new leasing production levels for 1985 and 1990. Major

TABLE 5-67

NO NEW LEASING ALTERNATIVE, COAL MINING AND BENEFICIATION EMPLOYMENT
CONSTRUCTION WORKERS

COAL REGION	1976 BASE CASE	CHANGE					
		LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
		1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	61,235	5,501	3,682	6,019	3,023	6,915	13,299
Central Appalachian	70,380	447	3,035	785	1,161	3,540	15,105
Southern Appalachian	8,045	838	465	727	173	3,178	111
Eastern Interior	44,338	18,415	23,084	17,865	39,763	11,337	59,520
Western Interior	3,089	312	50	473	2,378	562	9,787
Texas	3,652	5,532	2,212	5,716	10,570	3,955	20,112
Powder River	9,727	12,538	4,720	18,640	18,849	26,520	11,319
Green River-Hams Fork	6,806	1,728	5,020	5,757	4,454	8,366	3,823
Fort Union	2,508	386	782	1,793	2,998	3,670	6,823
San Juan River	2,525	814	4,615	2,069	10,553	3,996	11,141
Uinta-Southwestern Utah	3,891	819	3,404	3,278	5,861	5,793	6,311
Denver-Raton Mesa	602	19	2,827	440	3,664	1,140	2,938

TABLE 5-68

COMPARATIVE PROJECTIONS
COAL MINING AND BENEFICIATION CONSTRUCTION EMPLOYMENT

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE COALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	73,923	75,122	77,153	31	-30	-278	24	-9	-449	-64	-211
Central Appalachian	71,523	72,260	62,492	0	-331	-921	28	-202	-4169	-615	1771
Southern Appalachian	6,221	9,720	15,214	0	-329	-747	-359	6	1442	-1869	-1625
Eastern Interior	84,683	83,529	69,160	0	1256	-4622	-59	346	-4426	-1000	2595
Western Interior	3,799	4,208	4,379	-37	-209	17	-170	-27	-1691	-988	439
Texas	16,207	16,623	12,624	26	598	-3456	-79	146	-3583	-1637	3785
Powder River	38,268	52,165	70,085	0	345	6593	52	148	5470	247	-4987
Green River-Hams Fork	10,742	19,912	25,851	0	1078	7692	551	272	9094	9094	-4556
Fort Union	3,447	6,728	11,097	0	0	0	0	0	1092	-2186	1203
San Juan River	4,363	7,173	11,515	0	65	96	0	0	1481	-797	2037
Uinta-Southwestern Utah	5,718	11,268	16,954	0	129	163	119	33	2032	-1237	-66
Denver-Raton Mesa	640	1,599	3,198	0	0	0	0	0	312	312	636
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	69,104	79,402	95,410	0	144	-3276	-108	-26	-692	851	2045
Central Appalachian	67,540	74,055	83,263	-34	-1581	-6576	-223	-380	-2772	-1779	4534
Southern Appalachian	5,600	9,521	15,417	0	-359	-835	-16	-6	1433	-4325	-4395
Eastern Interior	115,816	137,194	148,821	-437	-4354	-30310	-7318	-1287	-18151	-5055	19514
Western Interior	3,830	7,567	17,925	-122	-2470	-13473	-1774	-365	-4342	-4510	2558
Texas	19,219	31,015	40,008	-259	-8650	-14033	-777	-936	-15705	-10339	-2193
Powder River	44,705	77,871	85,519	48	15110	69390	12519	2889	37981	24106	-8482
Green River-Hams Fork	17,590	26,091	31,089	960	5452	14143	705	1411	12965	12838	-8868
Fort Union	4,541	10,911	20,603	0	-1997	-2931	-796	-89	188	-6238	735
San Juan River	10,207	20,911	26,028	295	-2343	-282	-879	-173	581	-4320	1454
Uinta-Southwestern Utah	10,003	18,987	25,468	317	-1817	-1740	-1322	-49	1321	-8369	-2165
Denver-Raton Mesa	4,153	6,240	6,936	295	158	410	343	81	-667	-3818	187

TABLE 5-69

NO NEW LEASING ALTERNATIVE
COAL MINING AND BENEFICIATION EMPLOYMENT
OPERATIONAL WORKERS

REGION	1976 BASE CASE	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
		1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	101,184	37,332	-2,415	40,335	16,975	44,291	46,860
Central Appalachian	105,054	4,315	-3,616	5,909	6,195	-8,359	35,148
Southern Appalachian	14,932	-2,131	-749	4,767	738	15,871	2,333
Eastern Interior	51,337	38,112	37,236	37,743	63,784	24,182	87,747
Western Interior	3,994	382	81	892	3,768	965	14,878
Texas	2,092	7,200	1,728	7,437	8,252	5,143	15,701
Powder River	6,005	17,849	3,998	26,515	15,986	37,696	9,588
Green River-Hams Fork	4,380	3,689	4,263	9,269	5,516	12,720	4,928
Fort Union	1,462	612	638	2,524	2,441	5,078	5,528
San Juan River	1,565	1,658	2,412	3,349	7,165	6,649	7,130
Uinta-Southwestern Utah	5,249	1,743	2,664	8,526	7,958	15,550	10,111
Denver-Raton Mesa	11,128	-143	2,059	1,322	4,133	3,773	3,523

TABLE 5-70

COMPARATIVE PROJECTIONS
COAL MINING AND BENEFICIATION OPERATIONAL EMPLOYMENT

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	138,517	141,513	145,474	58	-55	526	41	-16	-849	-122	-407
Central Appalachian	109,367	110,965	96,695	0	-574	-1534	45	-341	-6900	-1092	2911
Southern Appalachian	12,802	19,704	30,804	0	-661	-1512	-727	19	2921	-2814	-3278
Eastern Interior	89,441	89,076	75,517	0	1485	-5062	-59	418	-4510	-1169	2827
Western Interior	4,377	4,855	4,956	-37	-209	74	-189	-19	-2019	-1153	554
Texas	9,292	9,533	7,238	17	343	-1983	-45	86	-2052	-939	2172
Powder River	23,852	32,532	43,699	0	144	4058	31	69	3333	82	-3204
Green River-Hams Fork	8,066	13,654	17,105	0	780	4909	449	196	5809	5809	-2757
Fort Union	2,073	3,989	6,542	0	0	0	0	0	638	-1277	700
San Juan River	3,224	4,910	8,217	0	70	98	0	0	910	-626	1210
Uinta-Southwestern Utah	6,992	13,774	20,798	0	155	198	115	38	2474	-1518	-77
Denver-Raton Mesa	986	2,448	4,901	0	0	0	0	0	14	14	737
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	136,099	158,495	192,333	0	279	-6518	-216	-52	-1340	1608	3952
Central Appalachian	105,754	32,139	133,843	-55	-2738	-11057	-379	-645	-4798	-3115	7791
Southern Appalachian	12,051	23,444	33,137	0	-775	-1836	-40	-23	3064	-9245	-9422
Eastern Interior	126,676	152,861	163,264	-463	-5299	-33176	-8013	-1556	-21264	-7872	22576
Western Interior	4,454	8,656	19,838	-136	-2846	-14974	-2101	-425	-5114	-5223	3097
Texas	11,021	17,781	22,941	-148	-4961	-8047	-446	-538	-9007	-5928	-1258
Powder River	27,850	48,521	53,290	19	15439	42999	7860	1780	23433	14815	-5450
Green River-Hams Fork	12,331	19,168	22,033	718	3679	9115	713	960	8394	8315	-5314
Fort Union	2,712	6,429	12,070	0	-1164	-1690	-464	-50	113	-3641	430
San Juan River	5,633	12,072	15,345	67	-1577	-294	-722	-157	178	-1222	701
Uinta-Southwestern Utah	9,658	21,731	30,910	144	-2450	-2361	-1466	-89	2229	-8367	-3665
Denver-Raton Mesa	3,041	6,580	8,424	67	-421	94	-50	52	-1639	-3026	-300

TABLE 5-71

NO NEW LEASING ALTERNATIVE
COAL CONVERSION AND UTILIZATION EMPLOYMENT
CONSTRUCTION WORKERS

REGION	1976	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
	BASE CASE	1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	123,485	5,979	-874	4,553	20,040	6,106	86,028
Central Appalachian	46,116	-411	12,667	2,945	21,737	3,141	30,092
Southern Appalachian	38,995	14,995	-341	27,014	7,907	26,337	30,166
Eastern Interior	89,842	16,310	10,697	18,975	11,252	23,036	21,485
Western Interior	34,090	21,262	5,366	32,133	51,099	33,612	58,371
Texas	14,854	33,581	19,131	55,092	87,312	55,638	97,848
Powder River	5,741	4,778	5,146	4,778	2,445	5,786	2,400
Green River-Hams Fork	7,935	3,089	2,057	4,330	-993	4,330	-960
Fort Union	10,678	2,729	6,924	1,642	18,166	9,473	6,795
San Juan River	7,860	34	1,459	170	1,236	2,568	7,949
Uinta-Southwestern Utah	3,389	6,180	3,763	6,221	2,160	7,028	5,148
Denver-Raton Mesa	4,171	4,970	5,244	6,684	7,292	7,221	5,908

TABLE 5-72

NO NEW LEASING ALTERNATIVE
COAL CONVERSION AND UTILIZATION EMPLOYMENT
OPERATIONAL WORKERS

COAL REGION	1976 BASE CASE	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
		1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	29,422	3,657	-579	5,551	3,264	3,271	18,122
Central Appalachian	5,594	-400	1,735	372	2,976	408	4,399
Southern Appalachian	6,718	4,030	65	6,509	1,851	6,701	5,082
Eastern Interior	15,381	6,338	2,657	7,092	4,164	9,011	8,278
Western Interior	3,967	4,769	1,013	7,342	7,755	7,587	10,027
Texas	1,913	8,014	3,024	13,298	11,914	13,382	15,546
Powder River	655	1,090	703	1,090	3,893	1,920	591
Green River-Hams Fork	917	737	291	977	1,366	977	-132
Fort Union	1,217	1,706	1,493	2.494	2,736	3,645	2,229
San Juan River	898	7	199	38	1,534	586	1,087
Uinta - Southwestern UT	1,039	727	516	1,148	797	1,845	686
Denver-Raton Mesa	842	1,353	751	1,694	1,318	2,086	2,461

increases are projected to occur in the Northern Appalachian, Eastern Interior, Texas, Powder River, Green River-Hams Fork, and Uinta-Southwestern Utah Coal Regions. The number of workers needed in the western regions would be fewer than those required for the labor intensive eastern mines, but the socioeconomic changes caused by the new western coal-related employment would be more significant. This would occur both because the relative the labor force required here generally exceeds the 1976 level and because there is a shortage of industrial workers in western mining regions.

Table 5-70 presents the level of projected increase or decrease from baseline conditions for each of the other program alternatives analyzed. As with the level of construction workers projected to accompany each alternative, the number of additional operational workers projected is dependent on both the baseline level of coal development cycle employment and the rate of projected coal production increases.

Estimates of the 1976 construction employment in coal-using facilities indicate approximately 387,000 workers are employed in this activity of the coal development cycle. By 1985, demand for an additional 230,000 workers is projected. Projections of construction employment, in 1985 and 1990, at the low, medium, and high production levels for the no new leasing alternative are presented in Table 5-71. Analysis of projected construction employment in this activity of the coal development cycle for other program alternatives indicates that no substantial variations from the no new leasing alternative are projected to occur by either 1985 or 1990.

As shown by Table 5-72, development of new coal-using facilities and an increase in the number of workers employed in such facilities would occur, even if no additional Federal coal reserves are leased. The 69 percent increase shown for 1985 reflects a nationwide surge in construction of new combustion facilities, and the data assumes the possibility of subsequent development of significant numbers of coal-based synthetic fuels plants by 1990. As noted earlier, neither the number nor the geographic distribution of synthetic fuels plants can be reliably projected, principally because of uncertainties about economic and technological factors which would influence the development of the synthetic fuels industry.

5.3.4.3 Agriculture. The adoption of any of the program alternatives would impact lands which are presently used for agricultural purposes. Surface mining, right-of-way construction, and power plant construction are coal-related activities that could require the use of agricultural lands. Without knowing the specific agricultural lands which may be disrupted by program-related coal development, this agricultural impact analysis is necessarily limited to a general discussion.

Table 5-73 provides an interregional comparison of agricultural values using the no new leasing alternative as a basis. Dollar values were determined from the average value of all crops per acre times the estimates of potential cropland for each region. While actual values and acres may vary, Table 5-73 provides a means for comparing agricultural impacts among the regions on a general basis. In addition, estimates of potential agricultural production loss for the program alternatives are presented in Appendix D, Tables D-5 through D-26.

In general, the relatively larger impacts in the Applachian, Eastern Interior, Western Interior, and Texas Coal Regions reflect more eastern land being devoted to cropland with a higher productivity value per acre than in the western regions.

The amount of land allocated to cropland for regional comparative purposes does not necessarily imply that a similar amount of prime farmland exists. This can only be determined after the completion of soil surveys for the designation of prime farmlands are completed. Once actual mining sites are identified and surveyed for prime farmland, specific options for mining would be available. Impacts on prime farmland would be minimized pursuant to the prime farmland and alluvial valley floor provisions of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and the land unsuitability criteria (see Table 3-1 and Section 5.4.8). Section 5.10(B)5A of SMCRA includes provisions for the protection of alluvial valley floors.

5.3.4.4 Fiscal Impacts. Coal-induced population shifts would change the level of demand for public services provided by states and local governments. The services required would include education, health care, welfare services, police protection, fire

TABLE 5-73

AGRICULTURAL PRODUCTIVITY VALUES, COMPARISON OF ALTERNATIVES[a]
(thousands of 1974 dollars)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
				1985 PROJECTIONS							
Northern Appalachian	517.0	507.3	523.8	0.1	-0.1	-1.2	-14.1	-14.2	-15.1	-0.2	-14.6
Central Appalachian	101.2	108.6	101.4	0.0	-0.7	-1.6	-0.3	-0.5	-4.3	-0.9	-1.3
Southern Appalachian	124.9	171.2	178.7	0.0	-3.5	-0.6	-2.8	-2.4	-4.8	-9.0	-5.4
Eastern Interior	2080.6	2099.7	2063.0	0.0	10.8	-19.9	-4.2	-0.1	-16.1	-51.1	8.7
Western Interior	538.9	664.8	682.2	-0.3	-27.2	45.0	-35.1	-30.4	-39.8	-0.2	97.8
Texas	165.2	228.9	218.6	0.2	2.5	-17.9	-1.7	-0.3	-13.0	-5.5	15.0
Powder River	1.9	2.3	3.0	0.0	0.0	0.2	0.0	0.0	-0.2	0.0	-0.2
Green River-Hams Fork	3.5	5.8	7.1	0.0	0.3	1.7	0.1	0.1	2.1	2.1	-1.0
Fort Union	22.1	26.5	47.3	1.9	2.0	0.3	2.0	2.0	4.7	-3.0	5.0
San Juan River	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uinta-Southwestern Utah	0.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denver-Raton Mesa	17.1	22.8	27.9	0.0	0.0	1.0	0.5	0.8	0.9	5.5	1.4
				1990 PROJECTIONS							
Northern Appalachian	479.4	551.6	800.0	7.0	0.8	11.4	-0.2	0.0	-1.0	2.2	3.4
Central Appalachian	107.2	128.4	145.4	0.0	-1.2	-1.2	1.4	-0.2	-0.6	-1.6	1.4
Southern Appalachian	119.8	182.6	234.0	0.0	-0.6	13.8	1.6	0.2	3.0	-6.2	-8.6
Eastern Interior	2096.4	2267.2	2519.6	0.0	-28.2	0.4	-23.2	-17.0	-30.0	-68.8	87.8
Western Interior	543.4	1049.8	1253.0	-0.2	-26.8	-94.2	40.2	-25.6	-17.6	-29.0	-32.4
Texas	207.8	421.8	470.0	-1.2	-25.4	-38.6	-7.6	1.6	-51.0	-32.2	-10.8
Powder River	2.4	3.6	3.6	0.0	0.8	2.4	0.4	0.0	1.2	0.8	-0.4
Green River-Hams Fork	5.2	7.0	8.0	0.2	1.2	3.4	0.0	0.2	2.8	2.8	-0.2
Fort Union	32.4	53.8	71.2	0.0	-3.2	0.0	-0.6	0.6	2.8	-13.8	2.2
San Juan River	0.2	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uinta-Southwestern Utah	0.4	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denver-Raton Mesa	26.8	35.4	40.8	0.0	0.0	3.8	-0.6	-0.6	2.2	0.2	-2.0

(a) Agricultural productivity values were calculated by multiplying the percent of total Land Disturbed (Section 5.3.2.1) devoted to cropland times an average value of all agricultural products sold per acre of land (Appendix H. Section H-6). Positive numbers represent greater productivity loss compared to the No Leasing Alternative.

protection, and the provision of water and sewage systems, recreational facilities, libraries, and highways. The fiscal impacts of the change in demand would depend on the change in the size of the population and of the levels and types of services currently provided. Capital expenditures to provide the needed social service facilities as well as funds to operate and maintain these facilities would also be required.

No estimates of the magnitude of the capital expenditures required are made in this statement since capital costs are a function of specific characteristics of the communities affected. For example, a community may have under-utilized school facilities and a part of the increase in the student population may be readily absorbed, thus reducing the per capita capital expenditure required. A public water system may require modification for which the capital expenditure is not proportional to the increase in population. On the other hand, current per capita annual expenditures are a measure of services provided and it is assumed that the level of service they represent would continue.

Estimates of additional "net" annual expenditures that would be required in 1985 and 1990 of the state and local government agencies in each state have been prepared. These estimates have been prepared on a "worst case" basis in the sense that it has been assumed that all coal-induced population shifts would represent migration between states. To the extent that population shifts are intrastate movements of people from one location to another or from one industry to another, the estimates represent an overstatement of additional state level expenditures. The estimates represent the net effect in terms of government revenues generated from sources within the state and expenditures required. State population changes would increase expenditures but would also increase revenues from individual income taxes, sales taxes, property taxes, various excise taxes, etc. The estimates of net additional expenditures and of the proportionate impact on total expenditures for coal producing states are presented in Tables 5-74 and 5-75. These data represent ranges based on the population shifts projected for the low and the high coal production projections for the no new leasing and preferred program alternatives. These options bound the upper and lower limits of all other alternatives addressed in this environmental impact statement.

Table 5-76 presents estimates for 1985 and 1990 of the changes which would occur in state and local government expenditures in non-coal producing regions. The magnitude of these changes is relatively small, representing no more than one percent of total expenditures and, therefore, these changes have not been offset against changes in revenue.

The difference between state and local expenditures and internally generated income represents that portion of revenue received from the Federal government through revenue-sharing and Federal-aid programs, such as Federal aid for highways or urban renewal funds. The total of the net changes—in the range of $153 to $445 million under the no new leasing alternative and of $146 to $655 million under the preferred program—represents the national increase in revenue sharing and Federal aid associated with the coal-related population. It does not represent an absolute increase in these revenues as it has been assumed that Federal policies in these areas would not change. The state-by-state net changes shown in Tables 5-74 and 5-75 may be construed as shifts in revenue sharing and Federal aid funding. However, due to the nature of the specific Federal programs, such changes might not be wholly realized. Therefore, the more severely impacted states such as Wyoming and Montana could seek to raise revenue by other means, for example, through the imposition of an increased coal severance tax.

5.3.4.5 Tax Lead Time. The ability of a region to absorb the impacts on the demand for public facilities and services from interregional population shifts depends on the size of the existing infrastructure and the magnitude of the impacts. Regardless of the Federal coal management program alternative finally selected, many areas in the western coal producing states would experience substantial increases in coal-related activities accompanied by significant increases in population. As a result, state and local governments having jurisdiction in these areas would experience significant fiscal impacts where existing public facilities and services systems are either currently deficient or are already at capacity. In other words, large highly developed infrastructures would be

TABLE 5-74

NET IMPACT ON STATE AND LOCAL GOVERNMENT
EXPENDITURES IN COAL PRODUCING STATES
NO NEW LEASING ALTERNATIVE
1985 AND 1990
(In 1975 Dollars)

STATE	1985		1990	
	AMOUNT (million $)	PERCENT IMPACT	AMOUNT (million $)	PERCENT IMPACT
Alabama	2-17	*-1	4-18	*-1
Arizona	3-5	*	4	*
Arkansas	6-11	*-1	6-34	*-2
Colorado	5-10	*	10-12	*
Georgia	5-8	*	4-14	*
Idaho	2-3	*	3	*
Illinois	24-18	*	47-50	*
Indiana	2	*	3	*
Iowa	2-3	*	3-4	*
Kansas	1	*	*-1	*
Kentucky	3-5	*	5-14	*
Louisiana	*	*	*	*
Maryland	2-5	*	4-5	*
Missouri	1-2	*	2	*
Montana	8-14	1-2	12-24	2-3
Nebraska	5-8	*	7-10	*-1
New Mexico	1-6	*-1	3-13	*-1
North Dakota	1-5	*-1	3-8	*-1
Ohio	3	*	*-6	*
Oklahoma	(*)-1	*	(*)-3	*
Pennsylvania	27-29	*	25-28	*
South Dakota	1-3	*	2-7	*-1
Tennessee	(2)	*	2-12	*
Texas	17-24	*	26-38	*-1
Utah	6-17	1	10-23	1-2
Virginia	5-2	*	(1)-1	*
West Virginia	7-1	*	4-22	*-1
Wyoming	21-52	4-10	33-66	6-13

*Value is less than 0.5.

( ) Decrease in net expenditures.

Sources: Derived from projections of coal-induced population shifts (Section 5.2.4.1) and from Reference Number 86.

TABLE 5-75

NET IMPACT ON STATE AND LOCAL GOVERNMENT EXPENDITURES IN COAL PRODUCING STATES PREFERRED PROGRAM 1985 AND 1990 (In 1975 Dollars)

STATE	1985		1990	
	AMOUNT (million $)	PERCENT IMPACT	AMOUNT (million $)	PERCENT IMPACT
Alabama	2-16	*-1	4-26	*-1
Arizona	3-5	*	4-13	*-1
Arkansas	6-11	*-1	6-19	*-1
Colorado	5-11	*	16-33	1
Georgia	5-8	*	4-22	*
Idaho	2-3	*	3	*
Illinois	24-16	*	47-71	*-1
Indiana	2	*	3-4	*
Iowa	*-1	*	1	*
Kansas	1	*	*-2	*
Kentucky	3-4	*	5-7	*
Louisiana	*	*	*-1	*
Maryland	2-5	*	6-7	*
Missouri	1-2	*	2-3	*
Montana	8-3	1-*	13-64	2-8
Nebraska	5-8	*	7-16	*-1
New Mexico	1-6	*-1	3-17	*-1
North Dakota	1-5	*-1	3-8	*-1
Ohio	3	*	3-32	*
Oklahoma	(*)-1	*	(*)-3	*
Pennsylvania	27-29	*	25-49	*
South Dakota	1-3	*	2-6	*-1
Tennessee	(2)-(1)	*	2-5	*
Texas	17-23	*	25-65	*-1
Utah	6-17	1	10-26	1-2
Virginia	(5)-(2)	*	(1)-26	(*)-1
West Virginia	7-1	*	4-36	*-2
Wyoming	21-58	4-11	46-92	9-18

*Value is less than 0.5.

( ) Decrease in net expenditures.

Sources: Derived from projections of coal-induced population shifts- (Section 5.2.4.1) and from Reference Number 86.

TABLE 5-76

IMPACT ON STATE AND LOCAL GOVERNMENT
EXPENDITURES IN NON-COAL PRODUCING STATES
BY CONSUMING REGION
1985 and 1990
(in 1975 Dollars)

STATE	ALTERNATIVE			
	NO NEW LEASING		PREFERRED PROGRAM	
	1985	1990	1985	1990
	(Million Dollars)			
California	5-12	6-22	5-12	6-61
Connecticut, Massachusetts, and Rhode Island	6-8	6-15	6-8	6-46
Delaware & New Jersey	(*)-1	(*)-1	(*)-1	(*)-9
Florida	2-5	13-49	2-5	13-62
Maine, New Hampshire and Vermont	1	1-2	1	1-6
Michigan	10-18	19-39	10-19	20-92
Minnesota/Wisconsin	12-27	22-9	10-28	22-62
Mississippi	1	1	1	1-3
Nevada	(6)	(6)	(6)	(6)-(5)
New York	10-13	9-83	10-13	9-30
North & South Carolina	5-9	4-(14)	5-9	4-25
Oregon & Washington	1-*	1-40	1	14-6

* Less than $0.5 million

( ) Decrease in expenditures.

Sources: Derived from projections of coal-induced population shifts (Section 5.2.4.1) and from Reference Number 86.

better able to absorb a given level of development than small underdeveloped infrastructures.

Overall estimates of fiscal impacts on a state-by-state basis are presented in Section 5.3.4.4. These estimates pertain to impacts on public services. The extent to which an individual community is impacted depends on the specific conditions that characterize it. The acquisition of funds to expand public service systems in order to meet coal-induced population increases is a major problem facing many communities. This problem is the result of:

- Time lags between the identification of specific public service needs and the operation of facilities to meet those needs, i.e., the time required to plan, design, and construct facilities.
- Time lags between the need to fund the development of the infrastructure and the generation of tax revenues from the additional population served.
- Geographic difference between the location of coal development and the jurisdiction receiving increased infrastructure demands.

Although prospective revenues (from royalties or severance taxes) resulting from the Federal coal management program may be more than adequate to cover that portion of the costs of local government operations not met through regular tax revenue services, as well as to cover the additional debt service and capital repayments for infrastructure development, they are not likely to be available when needed. This deficiency can be met in a number of ways.

If revenues generated by energy development are sufficient over the long run to meet the costs of expanding public facilities and services, loans provide a logical front-end funding mechanism. Alternatives under this category include:

- Loans through the Federal government—either in the form of a direct loan program or a guaranteed loan program.
- Prepayment of taxes (severance, property, income, sales, or use taxes) or royalties by coal producers over a period, for example, of two or three years before the intensive coal production activity begins. These prepayments would, in effect, be short-term, no interest loans by industry to the local or state governments.

Another revenue source involves direct financing assistance. This funding source presumes either that energy development would not normally provide sufficient long-term revenues to pay for needed community facilities, or that impacted communities should not have to pay, even if they can afford to over the long-term. Alternatives under this category include the following:

- Direct financial assistance from the Federal government through new or existing programs. There are a number of existing Federal grant programs of this type.
- Direct financing of needed community facilities by coal developers, voluntarily or as a condition for approval of state permit applications. Such financing could be provided under lease-purchase or lease-with-option-to-purchase agreements, under which the coal developer finances construction and the local jurisdiction leases the facilities with an option to purchase.

Various uncertainties plague coal developments. Stable and continued operation of mines and associated facilities can be threatened by contingencies over which neither the industry nor state government has control. Plant production could be cut-back or halted during the operation phase causing layoffs, migration out of the region, and loss of local and state government revenues. Second, even after major project permits are issued, legal, political, or financial contingencies may make it difficult or impossible to predict exactly when or whether plant production (and revenue generation) would occur.

Assuming that the anticipated development of coal results in a stable and continuing situation, state and local governments would receive revenues thr ugh taxes from the increase in population and through severence taxes or royalties. Revenue from the latter source could be used for debt repayment. Severence taxes, however, are not imposed by every coal-producing state (for example, Utah) and where they exist, the rate varies. Table 5-77 presents the current levels of severence taxes. These taxes apply to coal extracted from non-Federal land. The comparable source of revenue from coal extracted from Federal land is coal royalties. In August 1976, an amendment to the Federal Coal Leasing Amendments Act and the Federal Land Policy and Management Act increased the state share of lease and royalty

TABLE 5-77

SEVERANCE TAXES - COAL PRODUCING STATES

STATE	SEVERANCE TAX
Alabama	33.5¢ per ton for all coal mined.
Colorado	60¢ per ton on surface-mined coal. 30¢ per ton on underground-mined coal.
Montana	30 percent of gross value of coal produced.
New Mexico	38¢ per ton (steam coal). 18¢ per ton (metallurgical coal).
North Dakota	60¢ per short-ton (current rate); to rise 1¢ per ton for each one-point increase in Wholesale Price Index using 1977 as the base year.
Utah	No severance tax. Several taxes have been proposed; none have passed. The State now finances coal development impacts from Federal leasing royalties.
Wyoming	10.5 percent of gross value of coal produced.

Source: Reference Number 87.

payments for minerals extracted from Federal lands from 37.5 percent to 50 percent of total royalties paid to the Federal government, and relaxed restrictions on the use of these revenues, providing that they be used as the state legislature directs, giving priority to energy impacted communities.

Table 5-78 presents estimates of potential levels of royalties and severence taxes that might accrue to the various states under the Federal coal management program. The precise mix of Federal and non-Federal coal production for each of the western states is not known. However, the range of funds flowing to the states is calculated assuming 100 percent production on Federal lands (for royalty payments) and 100 percent on non-Federal lands (for severance tax payments). In this manner, the range of severence tax and royalty funds is effectively bracketed.

Mitigation of future tax lead time impacts can only be achieved through implementation of planning programs prior to energy resource development. Because of the general nature of the tax lead time problem, a concerted state and Federal approach with private participation would be required.

5.3.4.6 Coal Development Cycle Fatalities and Disabling Accidents. Fatalities and accidents can occur in all activities of the coal development cycle. They are caused by human error, structural and mechanical failures, and natural phenomena. This discussion considers those fatalities and accidents associated with coal mining, beneficiation, conversion, transporation, and use.

A number of observations are useful to place the discussion that follows in a proper perspective.

- Coal mining is a high-risk occupation. This is especially true for underground mining and, to a lesser degree, for surface mining.
- Due to these risks, increased coal production, whether by underground, surface, or some combination of the two mining methods, would result in increased levels of fatalities regardless of which Federal coal management program alternative is adopted.
- Increased levels of coal production would result in increased levels of disabling accidents and fatalities related to the coal development cycle. There would also be an increase in man-days lost due to disabling accidents.

Estimates of the fatalities associated with the no new leasing and preferred program alternatives (mid-level coal production) are presented in Table 5-79. The increases for the three regional groupings in this table are a function of the level of coal production and the method of mining. Thus, the proportionately larger production effort in the western regions results in a significant fatality increases in 1985 despite the predominant use of lower-risk surface mining techniques. The fatality increase in the midwestern regions is not as great as in the western regions because production is less. However, the fact that about half the coal produced is by underground mining tends to keep the fatality level high.

Estimates of the level of disabling accidents associated with the no new leasing and preferred program alternatives (mid-level coal production) are presented in Table 5-80. As with the level of fatalities, the level of accidents and total man-days lost are a function of the level of coal production and the extraction technology used. Despite generally lower accident rates associated with surface mining, increases in western coal production would be accompanied by substantial increases in the level of disabling accidents.

In the Appalachian Coal Regions, the increase in fatalities in 1985 over 1976 can be attributed primarily to use of underground mining methods (higher risks) with only a slight increase in production.

With regard to the 1990 figures, analysis is much more difficult. Although total coal production is projected to increase by about 28 percent over 1985 levels, the fatality level increases by over 60 percent. On a national basis, the same mix of mining methods is used in both years i.e., about 27 percent more coal is mined by surface than underground methods. The Appalachian Coal Regions show little differences between the no new leasing and preferred program alternatives, while the midwestern and western coal regions indicate a noticeable shift in fatality levels. Since the no new leasing alternative compared to the preferred program results in a greater emphasis on eastern production over western production, and increases in eastern production would cause a greater dependence on underground mining than on surface mining, it is probable that the fatality levels

TABLE 5-78

PROJECTED 1985 AND 1990 COAL ROYALTIES AND SEVERANCE TAXES [a]
(million dollars)

STATE	1985		1990	
	PROJECTED ROYALTIES [b]	PROJECTED SEVERANCE TAX REVENUES	PROJECTED ROYALTIES [b]	PROJECTED SEVERANCE TAX REVENUES
Colorado	31.4	12.5	49.9	16.3
Montana	148.6	393	259.1	664
New Mexico	30.9	8.4	64.2	21
North Dakota	36.9	19.2	49.4	31.5
Utah	31.4	None [c]	36.4	None [c]
Wyoming	229.4	425	366	577

(a) Projected on the basis of the medium production of the medium production level under the preferred coal management program alternative, assuming a value of $20 per ton at the mine.

(b) Represents the one-half share of Federal coal royalties occurring in affected states.

(c) Utah has no severance tax on coal production (as of October 1978).

TABLE 5-79

COMPARISON OF FATALITIES FROM COAL MINING, BENEFICIATION, AND CONVERSION UNDER THE NO NEW LEASING AND PREFERRED PROGRAM ALTERNATIVES (MEDIUM PRODUCTION LEVEL)

REGIONAL GROUPINGS	1976 BASE CASE	1985		1990	
		NO NEW LEASING	PREFERRED PROGRAM	NO NEW LEASING	PREFERRED PROGRAM
APPALACHIAN REGIONS (Northern, Central, Southern Regions)	113	143	142	192	183
MIDWESTERN REGIONS (Eastern Interior, Western Interior, Texas)	36	77	78	162	120
WESTERN REGIONS (Powder River, Fort Union Green River - Hams Fork Denver - Raton Mesa, Uinta - Southwestern Utah San Juan River)	18	61	58	104	141
TOTAL	167	281	278	458	444

TABLE 5-80

DISABLING ACCIDENTS
COAL MINING (SURFACE AND UNDERGROUND)

REGION	1976 BASE CASE	1985		1990	
		NO NEW LEASING	PREFERRED PROGRAM	NO NEW LEASING	PREFERRED PROGRAM
Appalachian	9,045	11,276	11,242	12,050	11,957
Midwest	1,558	3,290	3,337	6,111	6,018
West	407	1,349	1,319	2,092	2,067
Total	11,010	15,915	15,898	20,253	20,042

between eastern and western coal regions would differ accordingly for the alternatives. A greater fatality level is forecast under the no new leasing alternative in the Midwest where the increase in production is to occur (more underground mining) whereas the preferred program, which results in greater western production, forecasts just the opposite.

The projected level of disabling accidents in 1990 is approximately 27 percent higher than the projected 1985 level. This increase is attributable to increased coal production in both the western and midwestern coal regions. In 1990, only minor variations (less than 1 1/2 percent) are projected between the no new leasing alternative and the preferred program. Mining sector disabling accident levels projected to accompany other leasing alternatives are expected to vary in a similar manner. A discussion of projected levels of disabling accidents throughout the coal development cycle is presented in Appendix H, Section H.5.

Data for the other five program alternatives considered are not shown. The significant variations in the levels of projected fatalities for 1985 were estimated compared to the no new leasing alternative. In 1990, under the lease to meet industry needs alternative, one significant shift in fatalities was estimated, i.e., a decrease of 16 fatalities in the Eastern Interior Coal Region was balanced by an increase of 16 fatalities in the Powder River Coal Region. The probable explanation for this relates to coal production shifts to the West which tends to increase fatalities there, and a de-emphasis of underground mining in the Midwest.

A measure of the overall impact of projected fatalities and disabling accidents is the level of man-days lost due to accidents. In 1975, an average of 141 man-days were lost for every disabling accident in the mining sector of the coal development cycle. Fatalities in this sector are equated to 6,000 man-days lost. Based upon these assumptions of man-day losses per accident, Table 5-81 presents estimates of total man-day losses associated with coal mining. An expanded discussion of projected man-day losses throughout the coal development cycle is presented in Appendix H, Section H.5.

5.3.4.7 Cultural Resources. Due to the site-specific nature of potential impacts, programmatic effects on cultural resources can best be described generically for the various activity sectors of coal development.

Archaeological Resources. It is not possible, at present, to estimate the extent of potential archaeological resource impacts due to various levels of coal development. Present levels of archaeological site information are based primarily on localized general surveys or on surveys performed prior to specific construction projects (e.g., mines, highways, or power plants). The concept of archaeological site density for a particular coal region cannot be used to determine potential impacts except in a very general sense, since impacts depend on the exact location of a particular leasehold and on the activities associated with coal development in the leasehold.

Coal development activities, particularly those related to surface mining, produce surface disturbances which may affect archaeological resources. In general, archaeological sites might be affected by the disturbance of artifacts or other evidence of a surface site, by grading or excavation that destroys a subsurface site, by destruction of site integrity through alteration of the adjacent landscape setting, or by the exposure of a site to vandalism and unauthorized artifact collecting. It is not only the comparatively massive excavations associated with surface mining that could adversely affect an archaeological site, but even lesser activities such as vehicle parking and open storage of materials. Vehicle movement in an ungraded, unsurfaced parking area could easily disturb surface evidence or destroy a surface site. Similarly, the excavation and reclamation of a 6,000-acre surface mine may not encounter and thus not disturb any archaeological sites while a cut for a short section of 40-foot wide, employee-access road leading to this mine could completely destroy a site. A site-specific survey is absolutely necessary to determine any potential archaeological impacts due to coal development. Because of this variability of potential impacts, there is no direct correlation between interregional or intraregional coal production levels and the extent of potential archaeological site impacts.

A 1976 amendment to the National Historic Preservation Act of 1966 (16 U.S.C. 470) now requires that a Federal agency take into account

TABLE 5-81

PROJECTED MAN DAY LOSSES[a]
(millions of man days)

COAL REGION	1985			1990		
	DISABLING ACCIDENTS[b]	FATALITIES[c]	TOTAL	DISABLING ACCIDENTS[b]	FATALITIES[c]	TOTAL
Appalachian	1.6	0.8	2.4	1.7	1.1	2.8
Midwest	0.5	0.5	1.0	0.8	0.7	1.5
West	0.2	0.3	0.5	0.3	0.8	1.1
Total	2.3	1.6	3.9	2.8	2.6	5.4

a - Preferred program midlevel production.
b - Assumed to equal 141 man days lost per disabling accident. Reference Number 106.
c - Assumed to equal 6,000 man days lost per fatality. Reference Number 107.

Source: From Tables 5-78 and 5-80.

the potential impact of an undertaking not only on sites included in the National Register of Historic Places, but also on sites eligible for inclusion in the Register, and an executive order of 1971 (E.O. 11593, 16 U.S.C. 470) directs Federal agencies to locate, inventory, and nominate to the National Register properties under their jurisdiction or control. The National Register criterion used in determining the eligibility of archaeological sites is any site that has yielded or may be likely to yield information important in prehistory or history (36 CFR 800.10). The Department of the Interior, together with the Advisory Council on Historic Preservation, will take appropriate steps (site survey, evaluation, elegibility determination, impact analysis, etc.) to minimize potential archaeological disturbances.

Historical Resources. Although the number of historical sites presently on the National Register is far greater than the number of archaeological sites, there is still a need to protect important historical sites, particularly certain types of sites in the western areas. Historical sites and certain architectural styles are not as well represented in the West as in the East, with ranches and windmills particularly needing to be assured of adequate representation [56].

Any urban changes that occur because of coal development could affect the older, historic cores of existing communities. Representative architectural styles as well as buildings of local historical significance could be lost to make room for new structures. The historical integrity of a group of structures could similarly be affected by new construction. Although it can be postulated that some adverse impacts to historical resources would occur, it is not possible to estimate the extent or magnitude of such potential impacts at the level of this environmental impact statement or to determine how these impacts would differ among the program alternatives. However, as is the case with archaeological resources, the Department of the Interior, together with the Advisory Council on Historic Preservation, will take appropriate steps to minimize potential historic site disturbances.

5.3.4.8 Recreational Impacts. The greatest impact on recreation facilities would be the increase in the recreation demand caused by population increases. In addition, the areas being mined would be unavailable for any potential recreation activities until after reclamation efforts have been initiated or perhaps completed. Overcrowding and overuse of existing facilities, a decrease in the quality of recreation activities requiring facilities or solitude, increased administrative costs, and increased vandalism could result [57]. The increased demand for recreation facilities would also cause more conflicts between private land owners and people desiring to use land for recreation. The increased number of people going to the country for hiking, camping, and other outdoor experiences could reduce the quality of wilderness type recreation on large areas of public lands, particularly in the western coal regions.

While the Surface Mining Control and Reclamation Act of 1977 (Section 522(e)) prohibits new surface mining on certain types of recreational land systems, or within 300 feet of any public park, these areas could still be adversely affected by nearby mining operations.

Wildlife for viewing and hunting could be reduced through displacement of species distressed by noise, dust and human activities around mine sites, loss of habitat due to surface mining and pressure from increased urbanization. The increased hunting pressure could necessitate reductions in hunting seasons and bag limits. Demand already exceeds supply for deer and elk hunting permits in parts of western Colorado, reducing hunting opportunities in that portion of the Uinta-Southwestern Utah Coal Region [58]. Increased fishing pressure could also reduce the present capabilities of many areas to attract and sustain recreational fishing.

Workers brought into expanding coal development areas would tend to be younger and desire more recreational opportunities than the permanent residents. If long-term recreation facilities were built for the peak coal-related population, these facilities could become a tax burden when the peak level changes.

Expansion of coal mining could also have some beneficial impacts on recreation. Part of the greater tax revenue generated by the increased activities and population could be used to help alleviate pressure on existing municipal facilities. Mining operations could open up new roads and trails to off-road-vehicle use [59]. Recontouring and replanting of land during reclamation could sometimes increase habitat for small game, waterfowl, and migratory birds.

A detailed determination of the extent of potential coal-development-related recreation impacts is highly dependent upon a variety of regional and sub-regional specific recreation data. These data from the regional, county, and municipality level include the present use levels of all area recreation facilities and an analysis of these use levels in terms of capacity. This would provide the basis for determining which facilities have excess capacity, which are at capacity, and which are overused. The recreation characteristics of projected population increases would be needed to indicate what types of facilities or activities would be the focus of additional recreation pressures. The location of new mines would have to be known before the data required for such a recreation impact determination could be meaningfully collected. There cannot be at this time any substantive determination of how potential management program alternatives differ in this respect, except to the extent that the alternatives emphasize development of western region coal reserves particularly in the Powder River and Green River-Hams Fork Coal Regions. Accordingly, the lease to meet industry needs alternative would create the greatest stress on resident population lifestyles while the no new leasing alternative would reduce the stress. The determining factors are the potential changes in the coal-related population (see Section 5.3.4.1).

5.3.5 Transportation System Impacts

This section identifies and discusses the major impacts on the national transportation system due to the increase in coal production anticipated in the near-term (by 1985). For the purpose of quantifying some of these impacts, the medium level coal production projection has been used, i.e., 1.1 billion tons in 1985 and 1.5 billion tons in 1990. Production levels of this magnitude are substantially higher than the current (1976) production level of 674 million tons [59a]. Coal transportation requirements would, proportionately, increase even more as "coal from the West, where most U.S. reserves are located, will become more important . . . the transportation system will be required to accomodate both a substantial general step-up in the quantity produced and a dramatically sharp increase in western production, with the attendant longer hauls required" [60]. However, the proportionately greater increase in transportation requirements would be mitigated to some degree through an increase in intrastate movements due to the shifts in population into coal producing areas and to whatever extent the trend in minemouth consumption (about 12 percent in 1976) continues. Interregional coal flows are depicted in Figures 5-3 through 5-5.

The Department of the Interior was furnished with DOE computer outputs of the National Coal Model. These outputs were for the low, medium, and high production levels of the lease to meet DOE production goals alternative. Included in the data was an origin-destination matrix which formed the basis for identification of coal flows, transport routes and estimates of gross transportation ton-mileage by state for mid-level production. All other alternatives in this statement use this matrix as a basis for distributing coal production as no other comparable coal distribution patterns were available. Accordingly, impacts quantified in this section are generally presented in terms of comparing the DOE production alternative to the no new leasing alternative.

In terms of the modes of transportation used for coal movements, the railroad industry would have to assume the predominant burden of increased transportation of coal. Factors influencing these increases are:

- The pattern of coal flows could substantially differ from the current pattern which emphasizes flows from the western coal regions eastward.
- Western coalfields would, for the most part, be inaccessible to water transportation although movements involving different modes via the Great Lakes and the Mississippi River system could increase.
- Truck transportation would be limited to short-haul movements, generally movements within a state of 50 to 75 miles [61].
- Slurry pipelines would increase in significance as a coal transportation mode, provided certain major issues such as water availability and right-of-way access over rail lines are resolved. (However, as a transportation mode, they have limited application in the near-term. Total thruput capacity of all pipelines, operational or in the developmental stage, would be limited to 100-150 million tons per year in the period 1985 to 1990).

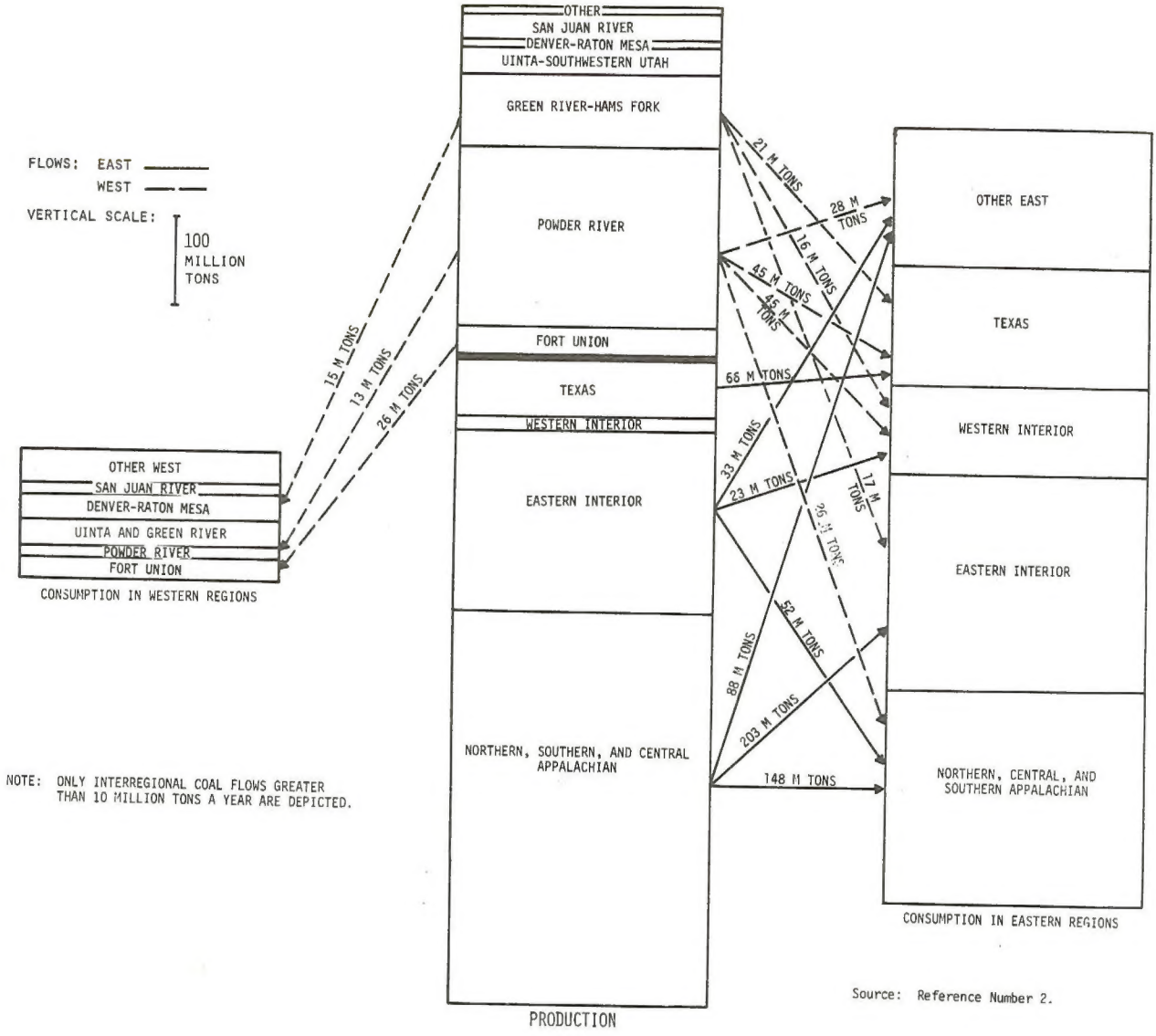


Source: U. S. Department of the Interior, 1977. Total Coal Movement, Map No. 5, National Energy Transportation Systems. U.S. Geological Survey. Reston, VA.

NOTE: This line thickness approximates 40 million short tons carried per year.

FIGURE 5-3

1974 MAJOR INTERSTATE COAL FLOWS BY RAILROAD



NOTE: ONLY INTERREGIONAL COAL FLOWS GREATER THAN 10 MILLION TONS A YEAR ARE DEPICTED.

Source: Reference Number 2.

FIGURE 5-4

REGIONAL COAL PRODUCTION AND CONSUMPTION FLOWS - 1985
MILLIONS OF TONS (M)

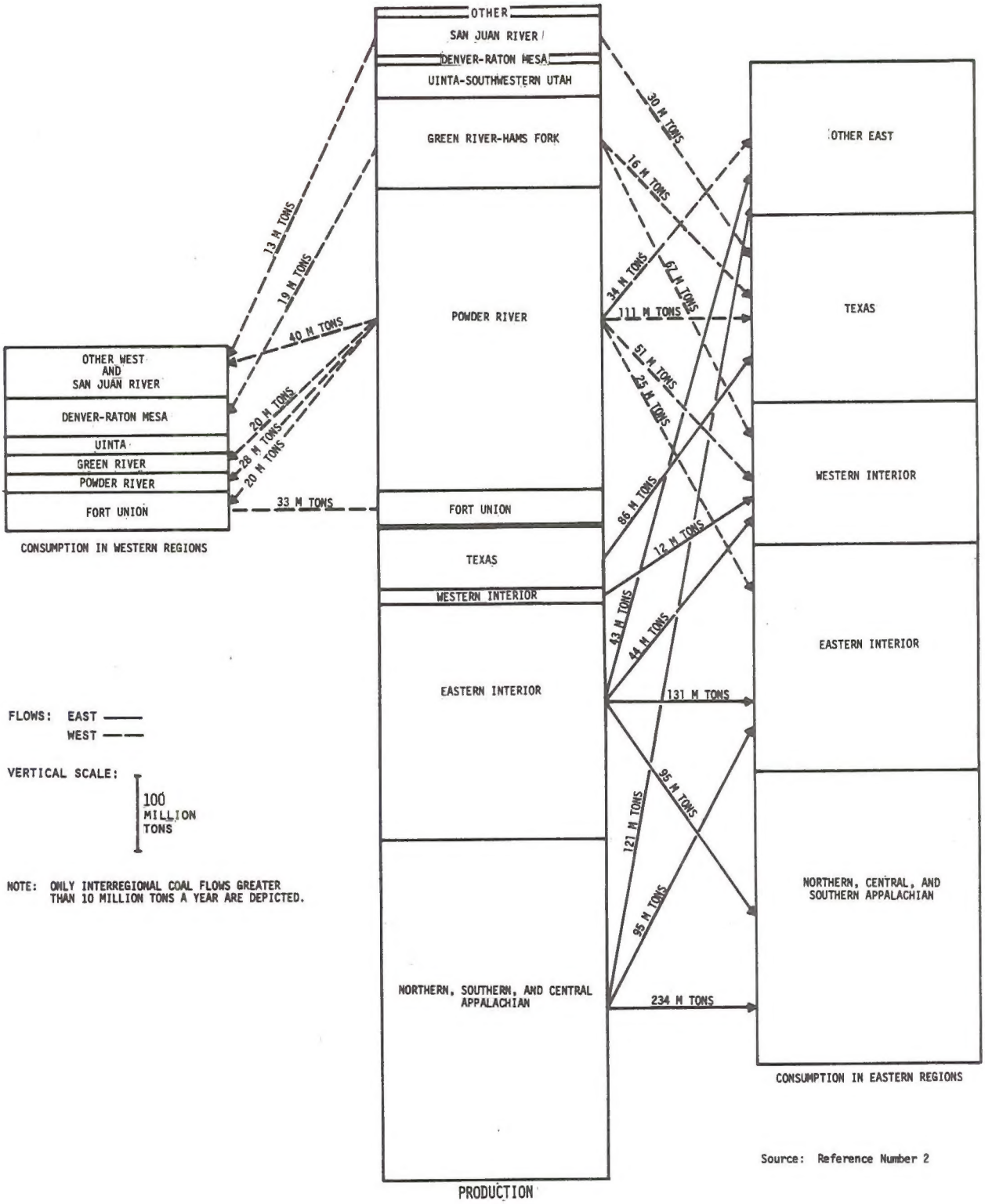


FIGURE 5-5

REGIONAL COAL PRODUCTION AND CONSUMPTION FLOWS - 1990
MILLIONS OF TONS (M)

In terms of net ton-miles of transportation service, the division among different modes, across all states, used in this analysis is as follows:

- Rail - 77 percent
- Pipeline — 13 percent
- Waterway — 9 percent
- Trucks — 1 percent

This section, therefore, focuses on the railroad industry and treats the other modes more briefly.

5.3.5.1 Railroads. As noted above, coal transportation by rail would increase due to both increased tonnage to be moved and the greater distances involved. Impacts on the railroads as an overall system or institution will both depend on, and in turn, be affected by:

- The physical capacity of the railroad system. This includes rights-of-way, railroad plant, and railroad equipment (freight cars and locomotives).
- The financial capability of the industry to secure the investments required to expand its physical capacity.

In addition, there are a number of operational impacts to be considered; the more significant of these include air emissions, operating energy requirements, fatalities, and problems relating to shipment by two or more transportation modes, such as transferring coal from rail to barge or truck.

For the purpose of considering institutional impacts on a "worst case" basis, it has been assumed that all interstate coal tonnage would be moved by rail and that 75 percent of the intrastate tonnage would move by rail, i.e., a total of 1,044 million tons of coal in 1985 and 1,456 million tons in 1990. Industry-wide impacts are considered as they affect the needs of the railroads to move all freight, not just coal.

System Capacity. The capacity of a transportation system is a complex concept involving both rights-of-way and transportation plant and equipment. System capacity may be defined as the volume of traffic that can be moved without undue delay because of traffic congestion. In this sense, capacity is a function of the type and condition of the right-of-way available, equipment availability, and operating conditions. Plant only affects capacity indirectly in terms of equipment availability, i.e., down time during car repairs, and operating conditions, and is not considered further with respect to the railroad industry.

In terms of rights-of-way, there are no comprehensive estimates of how much can be transported by the railroad industry [62]. The amount depends on miles of railroad lines (i.e. connection between two locations), the number of tracks per line, the length and spacing of sidings (to permit the passing of trains on the same single-track line), the type of signalling system and train control, and track conditions. It is also affected by how well the traffic load is distributed over time. When the volume of traffic to go from one terminus to another is fairly even, it moves much more easily than when it alternately peaks and drops off, especially if the occurrence of heavy traffic loads is unpredictable [63]. The condition of the track is of particular concern as this dictates the type of equipment and the loads that could be hauled, and influences capacity by affecting train speed. Therefore, it is recognized that many rights-of-way would have to be upgraded to accommodate major increases in coal traffic [60]. Rails would need upgrading to endure the heavier weight of coal trains–not merely by laying heavier rail sections but by concentrating on drainage, ballast, and ties [64].

Other means of increasing capacity, and thus eliminating potential bottlenecks, are available. These means include:

- Double tracking of existing single track line.
- Alternating single- and double-track.
- Increasing the length and frequency of passing sidings.
- Upgrading traffic control systems to automatic block signals or even to Centralized Traffic Control (CTC).

Among these means, double tracking with CTC would have the greatest effect on line capacity—raising it to 125 trains per day on a typical line [65]. Such measures could increase the railroad's capacity to handle increased coal and other traffic, and, in fact, extensive plans for improving rights-of-way have been formulated by some railroads concerned, e.g., the Burlington Northern and the Seaboard Coast Line. It has been stated that all required rights-of-way to transport the increased coal traffic projected for 1985 are in place and that plans exist to construct at least a further 300 miles of rail line to meet coal

needs [60]. This construction is estimated to cost $300 million.

Other estimates include 1,000 miles of new construction contemplated in the western coal regions. One estimate includes: 1) the completion of the line connecting Gillette and Douglas, Wyoming; 2) an extension of the existing Burlington Northern (BN) Decker spur northwest to the Colstrip, Montana spur and north along the Tongue River to the BN and the Milwaukee Railroad mainlines at Miles City, Montana; 3) completion of the BN Gillette north spur; 4) two extensions of the Sante Fe Railroad mainline north to the Star Lake and the Four Corners, New Mexico, area; and 5) an extension of the Union Pacific Railroad mainline to the Kaiparowitz Plateau [67].

Potential transportation impacts would be a regional issue due to the shift in the pattern of coal flows. Only 23,000 miles of railroad lines or 11 percent of the national totals (derived from Reference 66) lie within the borders of seven western states (Arizona, Colorado, New Mexico, Montana, North Dakota, Utah, Wyoming) in which over half the recoverable coal reserves are located; only 6,900 miles of railroad lines (three percent) are in Montana and Wyoming which contain the Powder River Coal Region (37 percent of recoverable reserves) as well as portions of the Green River-Hams Fork Coal Region.

The coal flows projected in this statement were analyzed on a state-by-state basis and compared to the capacities of the transportation system links over which they would move. This analysis took into account the increase in non-coal traffic projected at a compound annual growth rate of one percent. Based on assumed link capacities of 25 trains per day for single-track lines and 70 trains per day for double-track lines, it was determined that capacity would be exceeded in 1985 on five of the 215 coal routes examined. The sections of the rail network that may become overloaded are presented in Table 5-82. Expected capacity shortfall has been characterized as:

- Moderate — not more than 100 percent of capacity
- Severe — over 100 percent of capacity.

Given the above factors, and the expressed willingness of the railroad industry to expand line capacity as evidenced by their current plans, impacts on rights-of-way of projected increases in coal traffic would either be relatively small or could be mitigated through additions to or upgrading of the existing network.

Equipment needs to provide transportation service depend on the ton-miles of freight movements and the speed with which these movements are completed, i.e., trip turnaround time. In 1976, revenue freight movements of all Class I railroads were approximately 791 billion ton-miles [66]. Coal traffic is estimated to account for 15 percent of this total or about 110 billion ton-miles based on historical data [60, 68]. The average haul distances (based on the medium production projection for the lease to meet DOE production goals alternitive) used are as follows:

- Interstate movements of coal — 700 miles
- Intrastate movements of coal — 75 miles.
- Movements of other freight — 700 miles (derived from Reference 66).

Estimated freight transportation services would be as follows:

- Interstate coal movements — 574 billion ton-miles in 1985 and 854 billion ton-miles in 1990.
- Intrastate coal movements — 17 billion ton-miles in 1985 and 18 billion ton-miles in 1990.
- Noncoal movements — 738 billion ton-miles in 1985 and 775 billion ton-miles in 1990.
- Total movements — 1,329 billion ton-miles in 1985 and 1,647 billion ton-miles in 1990.

Freight transportation services of this order of magnitude would be substantially higher than the current level. Equipment requirements — hopper and other freight cars and locomotives — have been estimated for both coal and noncoal movements. Freight cars were examined in terms of hopper cars and other freight cars separately, as it has been assumed that all hopper car movements would be in unit trains. Freight car requirements are expressed in 100-ton car equivalents and have been estimated using assumptions with respect to the number of car trips per year, thus taking into account distance, average speed, and turnaround requirements.

Annual freight car trip assumptions are listed below:

- Interstate coal movements — 40 trips per year.

TABLE 5-82

POTENTIALLY CONSTRAINED RAIL LINKS

State	Route	Expected Capacity Shortfall	Road
Wyoming	East from Gillette to South Dakota border (Clifton)	Severe	Burlington Northern
Wyoming	North to South through Wyoming from Montana border (Frannie Jct.) to Colorado border (Cheyenne)	Severe	Burlington Northern, Colorado & Southern
Colorado	East from Glenwood Springs to Denver	Moderate	Denver & Rio Grande
South Dakota	North and South from North Dakota border (Aberdeen) to Nebraska border (Jefferson)	Moderate	Chicago, Milwaukee, St. Paul & Pacific
Tennessee	East from Nashville and Knoxville to North Carolina border	Moderate	Southern, L&N

Source: Reference Number 77

- Intrastate coal movements — 50 trips per year.
- Noncoal hopper car movements — 40 trips per year.
- Nonhopper car movements — 10 trips per year.

Estimated freight car requirements are presented in Table 5-83.

These estimates may be compared to the current (1976) freight car fleet of Class I railroads — 360,000 hopper cars and 1,330,000 other types of freight cars [66]. The current hopper car fleet (average car size - 80 tons) is sufficient in number but insufficient in carrying capacity to accommodate the increase in coal and other bulk freight assumed to be required by 1985. However, new cars being built are generally of 100-ton capacity and as old cars are retired the fleet carrying capacity would be increased.

Current manufacturing capacity for all types of freight cars is on the order of 80,000 cars per year [69]. Assuming that freight cars are replaced at an annual rate of four percent, the replacement of the freight car fleet other than hopper cars would require a production rate of 53,200 cars per year. Further, assuming that new jumbo hopper cars average 100-tons capacity per car, and that the balance of manufacturing capacity was devoted to the production of hopper cars, there would be a shortage of about 5,000 hopper cars in 1985 needed to promote the necessary capability. This shortfall is within the margin of error in the estimates developed. However, within the period 1985 to 1990, an additional 106,400 hopper cars would be required and the equivalent of 72,000 100-ton hopper cars would have to be replaced. Existing manufacturing capacity is insufficient to accommodate this requirement by 44,400 jumbo hopper cars; if the needs are to be met, freight car manufacturing capacity would have to expand at a rate of approximately one percent per year through 1990.

To meet increased coal transportation needs, the railroad industry would also have to expand its fleet of locomotives. This fleet has consistently been at a level of 27,000 to 28,000 units during the last decade [66]. Given the above levels of freight car requirements, locomotive requirements have been estimated. Assuming that all interstate hopper car movements would be by unit train operation and would require five locomotives per unit train for a total of 15,000 horsepower [64] and that all other movements would require comparable locomotive power, locomotive requirements would be approximately 27,800 units in 1985 and 33,700 units in 1990, of which 12,500 and 17,600 units respectively would be attributable to the transportation of coal.

Locomotives are estimated to be manufactured at a maximum of 1,700 units per year [69]. Taking into account that the manufacturing industry also produces 200 to 300 units for export annually, a more conservative estimate of 1,500 units available to the domestic market was used. Based on average annual acquisitions of locomotives by Class I railroads over the past decade, i.e., 1,050 per year [66], current manufacturing capacity would be sufficient to meet locomotive requirements through 1985, but insufficient in the period 1985 to 1990. During this period, 4,800 units would have to be replaced and an additional 5,700 units would be needed due to increased coal transportation. To meet this need, manufacturing capacity would have to increase at an annual growth rate of approximately 15 percent.

Financial Capability. The financial capability of the railroad industry should be viewed in terms of the total investment it might be required to make in order to provide transportation services both for coal and for other freight in terms of rolling stock, trackage, and other railroad facilities.

Over the past decade (1968 to 1977), gross new capital investment by Class I railroads has averaged $1.8 billion per year. Of this amount, 75 percent has been invested in equipment (allowing for the value of leased equipment) while the balance has been invested in roadway and structures [70]. This may be compared with recent estimates of capital requirements for increased coal transportation through 1985. One study [60] indicates that, between 1977 and 1985, $5 to $7 billion would be required to purchase and upgrade hopper cars and locomotives and a further $4 to $5 billion would be required to upgrade and build new track. In total, this would represent an annual average of up to $1.5 billion (87.5 percent of the level of investment in the last decade). Elsewhere, it was stated that between 1978 and 1985, the railroads would have to invest $6.4 to $8.8 billion in rolling stock for coal traffic, (840 million tons in 1985) of which $3.7 to $6.1 billion would be

TABLE 5-83

FREIGHT CAR REQUIREMENTS

EQUIPMENT	1985	1990
	Number in 100-ton Car Equivalents	
Coal hopper cars	249,800	352,200
Noncoal hopper cars	81,500	85,500
Total hopper cars	311,300	437,700
Other freight cars	728,000	766,000
Total freight cars	1,059,300	1,203,700

Source: Reference Number 66

attributable to new traffic [63]. In the same study, it was also stated that even without allowing for the projected surge in coal use, cumulative railroad capital requirements in the period 1976 to 1985 had been estimated by the Interstate Commerce Commission (in Ex Parte No. 271) at more than $42 billion; of this amount, over $35 billion represented equipment needs.

Estimates of this magnitude indicate the need for railroad investment in the short-term considerably in excess of the level in recent years. It is unclear to what extent such investment could be attributed to the anticipated increase in coal transportation.

One indication of the magnitude of the investment required to meet this increase is provided by estimating the needs for capital investment in equipment between 1978 and 1990.

Freight car requirements other than for hopper cars are such that investment is required only for normal replacement of equipment. Investment in hopper cars, on the other hand, is required to replace existing rolling stock with larger capacity cars and to increase the size of the fleet due to increased coal transportation. Assuming a unit cost of $30,000 [61,64], this investment has been estimated at $7.5 billion through 1990; of this amount, $2.3 billion would be attributed to increased coal traffic. Similarly, the increase in investment required in locomotives is estimated at $12.5 billion (based on a unit cost of $0.5 million [64]) of which $2.8 billion would be attributed to increase coal traffic. The total investment in equipment through 1990 is estimated, therefore, at $20 billion, of which $5.1 billion would be attributed to increased coal traffic.

In addition, an investment would have to be made in upgrading and constructing railroad lines. The size of this investment can only be estimated within a range of values. Currently there are 324,219 miles of railroad track comprising 199,411 roadway miles of line-haul railroads plus yard trackage and sidings. Roadway mileage consists of approximately 100,200 miles of branch lines and 99,200 miles of main lines. Assuming initially that 250 percent of main line roadway represents main line trackage plus yard trackage and sidings, such trackage would total 248,000 miles. However, deducting branch line mileage from total trackage results in a balance of 224,000 miles. It is assumed that the difference, 24,000 track miles, represents single-track main line. Therefore, an upper bound of potential investment in upgrading single-track main line can be estimated. Assuming that such upgrading requires an addition of 150 percent of track mileage, at a cost of $1 million per mile (60), the potential investment to upgrade the national rail transportation system would be $36 billion. A lower bound may be established by assuming that only main lines in the seven western coal-producing states would require such upgrading and that all such lines are currently single-track. The latter assumption is made to allow for the additional investment in constructing new branch lines in states as required. The lower bound is thus established at approximately $19 billion (based on 12,400 miles of main lines). The investment in new track is, therefore, estimated to be on the order of $19-$36 billion.

In addition, upgrading existing trackage would be required. At $0.5 million per mile for upgrading the balance of railroad trackage, including yard trackage and sidings, the investment required would be on the order of $5- $150 billion. The potential total investment in trackage would therefore be from $24-$186 billion. The lower bound of this order-of-magnitude estimate is more properly associated with increased coal traffic in the West through 1990. The upper bound represents potential investment in the railroad system that could be made to accommodate future growth in all railroad traffic, including further increases in coal traffic beyond 1990.

However, even the smaller of the above estimated investments, $24 billion, would increase the investment required of the railroad industry by approximately 80 percent over the level of the last decade and would have even greater impact on the specific railroad companies required to make the investment.

Further, while the financial posture of individual railroads varies considerably, the industry's current financial posture is relatively anemic. Earnings have been inadequate—three percent of operating revenues before payment of fixed charges and an overall deficit after fixed charges—and the rate of return on equity capital has been low (about two percent in this decade [66]). The shortage of internally generated funds has led to the deferment of road maintenance and the delay of road capital improvements by many railroads [63], and an increased reliance on equipment debt

and lease obligations [70]. Therefore, future investments of the magnitude indicated (approximately $1 billion per year through 1990), would have to be met through externally generated funds. While equipment trust certificates could be the means to acquire investment funds for freight cars and locomotives, the yield required might have to rise [61]. At the same time, the rate of return of railroad companies would have to increase to attract funds for investment in rights-of-way. Other sources of funds to finance rail extensions and engine and hopper car requirements are the coal companies and electric utilities. With increasing frequency, coal companies and utilities are constructing their own local spur lines and providing dedicated unit trains. This practice benefits the rail companies by conserving limited current operating revenues. However, in the longer term, total rail revenues would reduce trackage rights charges for movements over private spur lines and reduce rates for volume coal shipments.

Environmental Impacts. The major impacts resulting from the transportation of coal by rail have been summarized in Table 5-84. These impacts are shown for a base year (1976) and for 1985 and 1990 in terms of the production projections under the no new leasing (base case) and the lease to meet DOE production goals alternatives. The alternative of lease to meet DOE production goals was used for comparative purposes due to the extensive distribution information available for this alternative. The second paragraph of Section 5.3.5 has additional information vis-a-vis the DOE medium production level alternative. It should be noted that increases in future years, under either alternative, over the base year, would be directly proportional to the projected increase in coal traffic, i.e., about 70 percent in 1985 and about 140 percent in 1990. The other program alternatives would have changes in levels of adverse effects which are of the same order of magnitude, as presented in Table 5-84.

For the purpose of this statement, however, the differences in estimated impacts between the above two alternatives considered is of particular interest. In 1985, these differences would be less than one percent and, therefore, negligible. In 1990, the proportionate increase would be higher—on the order of three percent—for all aspects considered, but it is still considered to be insignificant.

Non-quantifiable impacts of increased coal transportation by rail are perhaps more severe. These impacts relate to the movements of coal trains through rural areas and communities along rail rights-of-way. Historically, major extensions of the rail network preceded the Nation's westward expansion, with many communities aggressively competing for initial rail access and improved rail service. In more recent years, however, there has been growing public concern regarding projected increases in coal movements, particularly in the West.

Impacts of railroads on highway traffic relate to both the length and the number of unit trains. A 100-car unit train averages about 1.6 miles in length. Somewhat smaller volumes of rail traffic are expected from Montana and Wyoming coal fields southerly through the Colorado Front Range to Texas. The volume of train movements, particularly along the east-west lines through Montana and Wyoming, could be 50 trains a day by 1985 and 75 trains a day by 1990. Unit trains normally take about 3.5 minutes to pass a particular point at 20 miles per hour. If the speed slows to five miles per hour, as it often does near inspection, maintenance, and classification yards, the train takes approximately 13 minutes to pass a point. Shorter delays would occur in undeveloped areas where the train's speed can increase. While the passage of a single train may not create significant problems, repeated passages may. Volumes of this magnitude would block non-separated rail/highway crossings (i.e., at grade level) for substantial portions of the day. Queuing of vehicular traffic would increase, thereby appreciably adding to the transit time required to traverse those communities built up along existing rail routes. Grade crossing fatalities could also increase. Blockage of grade crossings would also increasingly hinder the movement of emergency fire, police, and health vehicles.

The extent of the rail/highway crossing impacts would be highly site-specific, depending on the location of the rail line, the volume of rail and vehicular traffic, and the type of rail crossing. Federal Railroad Adminstration standards for rail crossing protection devices are based in large part on rail and vehicular traffic volumes. In smaller communities, the local traffic volumes would be

TABLE 5-84

MAJOR RAIL TRANSPORTATION ENVIRONMENTAL RESIDUALS MEDIUM COAL PRODUCTION LEVEL

YEAR AND ALTERNATIVE	AIR EMISSIONS (Thousand Tons)					NUMBER OF FATALITIES	OPERATING ENERGY (10^{12} Btu)
	TSP	HC	CO	SO_2	NO_x		
1976 Base Case	21.3	81.0	112.5	49.2	320.3	132	231.8
1985: No New Leasing Alternative	36.2	136.5	188.9	82.8	538.0	221	389.5
Meet DOE Goals Alternative	36.3	137.0	189.3	82.9	539.1	222	390.2
Change in Residuals	0.1	0.5	0.4	0.1	1.1	1	0.7
1990: No New Leasing Alternative	50.1	189.3	261.6	114.9	744.9	306	539.7
Meet DOE Goals Alternative	51.8	194.5	269.4	118.1	766.8	317	554.4
Change in Residuals	1.7	5.2	7.8	3.2	1.9	11	14.7

invariably too low to necessitate separated crossings or, in many instances, even flashing warning lights or crossing gates. Additionally, among small communities traditionally developed around rail main lines, the lines often cut the town into segments. Even nominal increases in rail traffic through these communities can create substantial physical barriers to the free flow of commerce and personal traffic. Communities desiring additional safety devices usually would be required to fund these improvements out of local and state tax revenues, via a cooperative cost sharing with or reimbursement by the railway company, or through matching fund programs with the state highway department or agency. Various cost sharing programs are available such as the matching fund provisions for rail/highway grade crossing improvements from the U.S. Department of Transportation (DOT) under the Surface Transportation Assistance Act of 1978 and the Highway Safety Act of 1973.

For new rail extensions, however, there is greater flexibility for advance planning for separated crossings. For example, the Interstate Commerce Commission certificate authorizing the construction of the rail line connecting Gillette and Douglas, Wyoming, required adequate access and ease of movement for local residents. As a result, more separated crossings are being constructed than were contemplated in the initial engineering plan.

Methods of expanding the rail network in the western coal regions also would have the potential to disrupt plans for the orderly development of local coal resources envisioned under the Federal coal management program alternatives. It is possible to construct major new rail lines without prior authorization from the Federal Government [67]. This can be accomplished in a number of ways:

- Aligning new rights-of-way to avoid Federal lands.
- Constructing spur lines rather than branch line extensions, thereby avoiding the certification processes under the Interstate Commerce Act.
- Construction of new lines by coal companies rather than rail carriers (coal companies are not common carriers by rail subject to the Interstate Commerce Act).

Once private rail lines are in place, there is typically greater pressure to lease and develop additional coal reserves in areas possessing adequate rail access as opposed to reserves in areas lacking such access. One coal management program policy suboption (see Section 5.4) would limit new Federal leases to areas with established transportation access. However, this might have limited utility as long as the industry can construct private rail lines to private coal reserve areas. The option would thus tend merely to delay new leasing in limited access areas for the one to two years required to construct major rail extensions.

It should be noted that the construction and operation of additional rail lines can produce beneficial as well as adverse impacts. Rail construction generally requires a 100 foot wide right-of-way. The flora on a right-of-way is eliminated where the trackage is placed and it is altered on either side of the trackage where rail right-of-way maintenance is conducted. Any loss of vegetation results in a concomitant loss of wildlife habitat. Alteration of right-of-way vegetation, however, often results in a linear strip of semi-maintained native vegetation which adds to the ecological diversity of the local area. This vegetative strip can be especially valuable to wildlife in regions such as the Eastern Interior and Western Interior Coal Regions where intensive agricultural practices have seriously reduced available wildlife cover. Other less significant rail-oriented ecological effects include rail kills of wildlife, right-of-way fires, fugitive dust, air emissions, water pollution, and wildlife restrictions due to right-of-way fencing. Rail kills are unusual and do not pose a serious threat to any wildlife population. Right-of-way fires do occur, particularly in regions with arid climates, but they are generally small localized brush fires which only cause temporary alterations to adjoining ecosystems. Fugitive dust, air emissions, and water pollution from train movements and spills cause localized minor ecological impacts. Lastly, fences along right-of-way generally do not restrict smaller mammals and birds. Pronghorn antelope is the only species of wildlife seriously restricted by fencing.

5.3.5.2 Waterways. During the last decade, shipments of coal by water have been on the order of 70 million tons per year while movements involving the use of more than one mode have involved

an additional 35 to 40 million tons [71]. The greater part of these movements has involved the transportation of Appalachian coal via the Ohio and Mississippi River systems. It is anticipated that coal movements by water would increase in 1985 though the market share of shipments by this mode would decrease.

System Capacity. The carriage of coal by water takes place primarily on the inland waterways system developed by the U.S. Army Corps of Engineers. The important segment of this system for coal movement consists of the Ohio and Mississippi Rivers, constituting 9,000 miles of waterways, more than half of which are nine feet or deeper [61].

However, the annual capacity of this system is not a function of mileage or of channel depth; it is determined by the annual throughput of the locks that form part of the waterway. Passage through the locks may involve undue delay, causing bottlenecks in the system. It has been stated that a waterway reaches capacity when the average delay time at a lock exceeds 150 minutes [72]. Certain locks already exceed or are close to exceeding design capacity [72]. These include the following locks:

- Locks 50 to 53 on the Ohio River.
- Locks 26 and 27 on the Upper Mississippi.
- All locks on the Illinois River system.
- Lock No. 3 on the Monongahela River.
- Winfield lock on the Kanawha River.

These are potential congestion points that would impede the flow of waterborne coal generated by increased production. In addition, while a number of other points have been identified as potential problems, they are amenable to nonstructural solutions such as improved scheduling or helper boats [60,62]. The congestion points listed above would require long-term structural solutions through the modification or replacement of the existing locks.

In terms of waterborne equipment for coal transportation, i.e., barges and towboats, requirements for these additional vessels could be met as coal traffic grows through 1985 and beyond [60]. Projected 1985 waterborne coal traffic is about the current level and, therefore, equipment needs would be limited to replacements. Increased requirements through 1990 should pose no problem as sufficient shipbuilding capacity (1,400 barges per year and 40 towboats per year) can produce coal-dedicated equipment with the capacity to handle up to 250 million tons per year during the next decade.

Environmental Impacts. As little movement of coal by water is expected, the environmental impacts are predicted to be negligible. However, some of the likely effects are discussed below in qualitative terms. These impacts would result from any increase in waterborne traffic and are not specifically due to transporting coal.

There would be some increase in noise and in air pollution. Oil discharges from tugs are a potential source of water pollution. Increased traffic might increase turbidity and barge wash thus impacting aquatic and shoreline ecosystems. The dredging of river channels and the disposal of material therefrom may also impact these ecosystems. Finally, increased barge traffic would induce shoreline development to provide barge-related services; such development could result in secondary impacts on air and water quality and on noise levels.

5.3.5.3 Highway Transportation. Coal transportation by highway would be limited to movements within a state and to the movement of coal from mine to rail tipple or barge-loading facility. In either case, coal would move over short distances. Historically, this movement has taken place predominantly in the Appalachian Coal Regions and, to some degree, in the Eastern Interior Coal Region. The impact of such movements, particularly in Appalachia, has been a matter of concern in the past, as coal trucks travel on local and secondary road systems inadequate to withstand repeated usage by heavy duty trucks, even where the gross vehicle weights are within posted limits [61]. A comprehensive study of highway needs related to energy activities, undertaken under Section 153 of the Federal-Aid Highway Act, found that an estimated $4.1 billion was required for the restoration of highways used for energy resource handling in 1975. In the same study, 18 of the 24 states in which coal resources are located reported a total need for a further $3.2 billion identified with increased coal production through 1985 [60]. If the preferred program and other program alternatives result in decreased eastern coal production, further impacts on local highway systems, both in terms of roadway deterioration

and traffic volume, would be mitigated. At the same time, it is anticipated that a need for new roadways to move coal and for the transportation of people and goods would emerge in the western coal producing states. The extent of this need cannot be quantified as it is dependent on the location of mines, transportation facilities, and communities developed or impacted.

In terms of equipment, i.e., heavy duty trucks, there would be no perceptible constraint on availability. Manufacturers are currently operating at 70 percent capacity, building just over 60,000 dump trucks annually [60]. Equipment requirements cannot be quantified as the extent of movements involving more than one mode is unknown.

Environmental Impacts. Social, environmental, and safety impacts of highway movements of coal are already being experienced—most severely in Appalachia [60]. Such impacts could become more severe with increased coal production, but are not specifically attributable to any of the program alternatives. Perhaps the most important impact would be the perceived, rather than actual, impact of truck traffic on a local community (i.e., the residents would be aware of more traffic volume, noise and vibrations, coal spillage, and visual impacts). These impacts would be a consideration in determining the need for highway improvements and additions, together with such mitigating measures as restricted routing of coal traffic.

Energy development impacts on transportation systems are currently being assessed by the National Energy Transportation Study Task Force for the Departments of Energy and Transportation. Their study is to analyze energy-related transportation problems and needs on a nationwide basis.

5.3.5.4 Coal Slurry Pipelines. The use of slurry pipelines for the transportation of coal is still in its infancy, although the technology is well developed. Only one such pipeline system, the Black Mesa slurry line with annual through-put of 4.8 million tons, is currently operational. Additional pipeline systems are in the process of being developed to provide transportation capacity of about 140 million tons per year. Due to the time required to plan, construct, and make coal slurry pipelines operational, and to resolve the issues surrounding the development of this industry, no significant coal pipeline transportation capacity is contemplated through 1990. One study suggests a total capacity of 200 million tons by the year 2000 [73].

The rate at which the coal slurry pipeline industry may develop is a matter of speculation due to the constraints imposed by several issues, primarily water availability and eminent domain. Most of the proposed coal slurry pipelines originate in arid western states where water is already a scarce resource. In these areas, about 90 percent of the existing available water is used for agricultural purposes and the developing energy-related industries have to compete for water with recreation, domestic needs, and industrial activities, as well as farming. The process of coal slurrying requires approximately one ton of water for each ton of coal. Based on the assumption that the slurry pipelines currently under developmental study become operational, there would be a need for approximately 100,000 acre-feet of water per year. While this quantity of water would be a small portion of available surface water, and additional water might be available from aquifers such as the one underlying the Madison Formation, the exporting of such a valuable resource has met with a mixture of support and opposition from Westerners. On the other hand, the developers of one of the larger proposed pipelines, Energy Transportation Systems, Inc. (ETSI), have already been assured of the availability of water by legislative action in Wyoming; this suggests that this issue might be resolved in the near future.

The question of eminent domain is equally controversial. To obtain rights-of-way for the proposed pipelines, proposals have been made at both the state and Federal levels to grant pipeline developers the right to exercise the power of eminent domain. While this proposal was recently rejected by the U.S. Congress, a number of western states have legislation that would permit the granting of such rights. Several proposed pipelines companies are seeking rights-of-way without grant or condemnation authority. ETSI appears to have acquired virtually its entire right-of-way in this manner.

Whether the above constraints on the development of coal slurry transportation will be continued or resolved remains a matter of speculation; therefore, the potential impacts of this mode of transportation cannot be assessed at this time. It can, however, be stated that the environmental

impacts of slurry pipelines, with the exception of water requirements, are generally of more concern during the construction of the pipelines rather than during operation. The impacts associated with pipelines, both during construction and operation, have been assessed generally in a recent study [73].

5.3.6 Operating Energy

It takes energy to produce energy. Thus, during all phases of the coal development cycle, energy would be expended. The energy expended in this way, defined as operating energy, is in the form of coal, oil (mainly diesel oil), gas, and electricity. In order to determine how much operating energy would be required, the heat content of these energy forms is equated to the heat content of the coal that would be recovered. To simplify the comparisons, operating energy is expressed in terms of its heat equivalent in British thermal units (Btus). Appendix H presents additional detail on how this conversion is derived. The same amount of energy (in terms of Btus derived from coal) is assumed for all seven alternatives at an equivalent level of production (i.e., high, medium, or low). Therefore, that alternative which requires least operating energy for all of the coal-related activities (all phases of the coal development cycle) at the medium level of production will obviously leave the greatest amount of net energy for other useful purposes, such as heat, light and power. The same will be true at the other levels of production. Conversely, the alternative which uses the most operating energy at a given production level will leave the smallest net energy balance.

The discussion that follows presents background material describing operating energy in terms of phases of the coal development cycle, followed by an analysis of operating energy requirements on a regional basis for the seven program alternatives.

5.3.6.1 Coal Extraction. During coal extraction, energy is consumed by cutting and loading devices, such as drills, mining machines, draglines, crawler-type loaders, and shuttle cars. In underground mining, greater use is being made of continuous mining machines which can cut the coal loose and load it in one operation. Mine cars, conveyors, and shuttle cars are used to bring coal to the surface. Strip mining operations employ equipment such as shovels, dragline and wheel excavators, scrapers, bulldozers, loaders, and drills. In auger mining, giant coal augers are used to reach coal that cannot be strip mined because there is too much overburden. All mining methods would use various forms of electric and diesel engines to power equipment. The overall operating energy that would be expended in this phase of the coal development cycle is assumed to be four percent of the Btu content of the coal in place [71,74].

5.3.6.2 Beneficiation. Energy would also be consumed in the refining and processing of coal. The major operations involved are crushing, screening, wet and dry washing, and thermal drying. The overall operating energy expended for coal cleaning is assumed to be 0.7 percent for crushing and screening and 4.6 percent for mechanically cleaned and dried coal [71,75].

5.3.6.3 Coal Transport. Energy would be consumed by trains, trucks, barges, and slurry pipelines to move coal from the production and beneficiation facilities to other locations. The operating energy expended in the transportation of coal is measured in Btus consumed per ton-mile transported. It is quantified as a function of the mode of transport as follows [76]:

- 670 Btus/ton-mile for rail transport,
- 680 Btus/ton-mile for barge transport in small rivers,
- 2800 Btus/ton-mile for truck transport, and
- 450 Btus/ton-mile for slurry pipeline transport.

5.3.6.4 Coal Conversion and Utilization. Energy would be expended in coal conversion and utilization facilities to operate equipment such as pumps, cooling towers, and pollution control devices. The operating energy required for these purposes is assumed to be as follows [39,45]:

- 3 percent for steam electric power plants,
- 2 percent for gasification plants,
- 0.9 percent for liquefaction plants, and
- 2.7 percent for coke plants.

5.3.6.5 Efficiency of the Coal Development Cycle. Based on the above factors, operating energy can be calculated for each phase of the coal development cycle. For example, for every 100 Btus present in the coal in the ground, four percent or four Btus would be expended in extracting the coal. Thus, a net of 96 Btus would be brought from

the mine. During beneficiation, as much as 4.4 Btus would be expended (4.6 percent of 96 Btus delivered for processing) resulting in a net of 91.6 Btus after this phase. Assuming that transportation would take approximately another one Btu (one percent of 98.6 Btus), of the original 100 Btus, about 90.6 Btus would be available for conversion and utilization. For example, in an electric power plant, 2.7 Btus (or 3 percent of the plant input) would be used to operate the plant and 88 Btus would be the net feed to the plant to be converted to electric power. The flow chart in Figure 5-6 summarizes this discussion.

It is important to note that the Btu loss due to coal conversion into synthetic gas or liquid fuels, or coal utilization to generate electric power, or to make coke is distinct from the operating energies considered in this section. For example, the thermal efficiency of steam/electric power plants is 35 percent on the average; for every 100 Btus in the coal, only about 35 Btus of electricity would be generated. Similarly, the average thermal efficiency of coke plants is 70 percent, of gasification plants 65 percent, and of liquefaction plants 69 percent [1,39].

5.3.6.6 Operating Energy Requirements. Estimates of operating energy expended during the coal development cycle are presented in Table 5-85. The table indicates energy that would be expended at the low, medium, and high production projections for the years 1985 and 1990. These are shown as the differences in operating energies between the 1976 actual values and the expected values for 1985 and for 1990. Table 5-66 shows differences between the no new leasing, alternative and the other coal management program alternatives by year and by region. Differences between regions for a given alternative may vary substantially. For example, in 1985 at the medium production projection for the no new leasing alternative, the range between the Northern Appalachian and Denver-Raton Mesa Coal Regions is 415.8 trillion Btus (TBtus). This is equivalent to the combustion of about 19 million more tons of coal in the Northern Appalachian Coal Region. As can be seen below, greater levels of production and consumption in the Northern Appalachian Coal Region would result in higher operating energy expenditures.

	Northern Appalachian Coal Region	Denver-Raton Mesa Coal Region
1985 Production (tons)	211,700,000	5,000,000
1985 Consumption (tons)	182,900,000	20,100,000

In 1985, in the Green River-Hams Fork Coal Region, the lease to meet industry needs alternative would have the greatest increase in operating energy: 38.6 TBtus or about 1.75 million tons of coal equivalent. This would be due in part to a 47 percent increase in coal production in that region over the no new leasing baseline.

For the year 1990, the greatest increases in operating energy are in the Powder River Coal Region (for the preferred alternative medium level), equivalent to about 4.5 million tons of coal. This increase resulted from a 31 percent increase in coal production. Overall, it can be seen from Table 5-86 that at the medium level of production, net changes from the no new leasing alternative (as a base level) would in 1985 be slight for most options. Leasing to meet industry needs would pay an energy premium of about 40 TBtu. The other alternatives would either slightly decrease operating energy requirements or result in only negligible increases. In 1990, at the medium production level, the preferred alternative would increase operating energy requirements by some 30 TBtu. An even larger increase (70 TBtu) would occur under leasing to meet energy needs, whereas leasing to meet DOE production goals would increase operating energy about 7 TBtu and PLRAs by about 20 TBtu. State determination of leasing would show a reduction of more than 10 TBtu from the no new leasing alternative. At the projection of high coal production, the preferred alternative would substantially increase the operating energy requirements in both years over those of the base case.

In summary, wherever coal production, consumption, or transportation increases, operating energy expended will increase. On the average, about 10 percent of the energy in coal is consumed during the coal development cycle as operating energy.

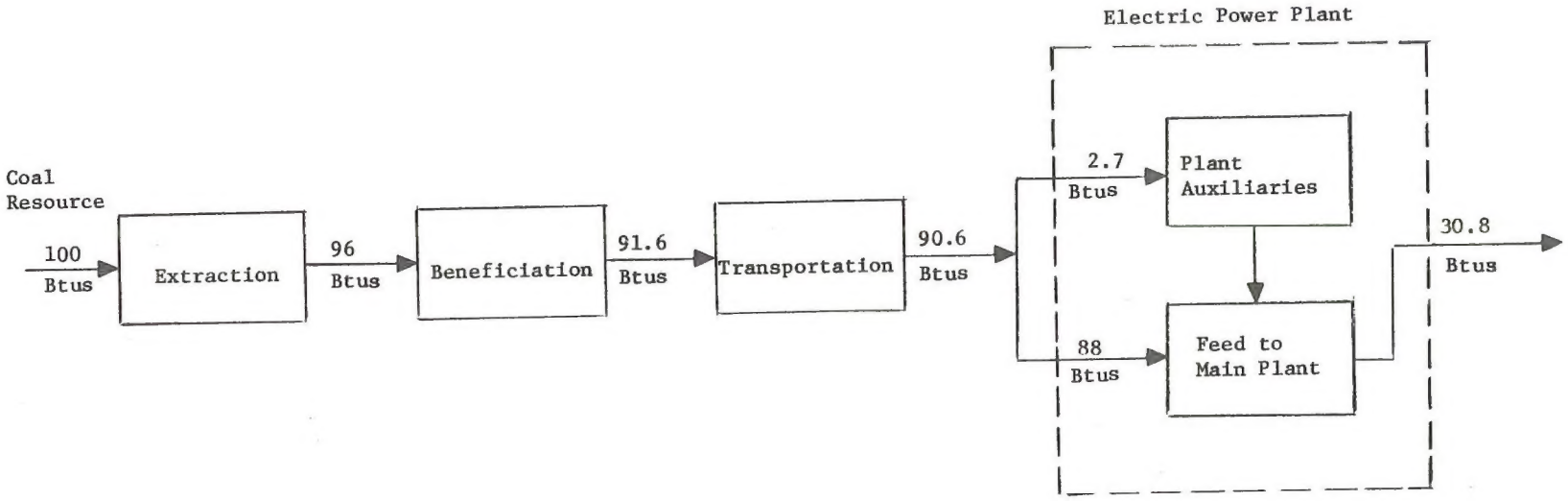


FIGURE 5-6

OPERATING ENERGY IMPACTS ON THE COAL CYCLE

TABLE 5-85

NO NEW LEASING ALTERNATIVE, OPERATING ENERGY IMPACTS

(trillion Btus)

REGION	1976 (a) BASE CASE ABSOLUTE VALUES	LOW PRODUCTION LEVEL		MEDIUM PRODUCTION LEVEL		HIGH PRODUCTION LEVEL	
		1985-1976	1990-1985	1985-1976	1990-1985	1985-1976	1990-1985
Northern Appalachian	384.0	73.0	-16.0	85.0	50.0	96.0	174.0
Central Appalachian	338.0	13.0	-1.0	26.0	41.0	-9.0	132.0
Southern Appalachian	82.8	23.2	1.0	23.2	19.0	82.2	46.0
Eastern Interior	289.0	183.0	130.0	188.0	231.0	140.0	350.0
Western Interior	104.0	65.0	16.0	96.0	100.0	106.0	173.0
Texas	52.6	111.4	34.0	149.4	150.0	138.4	220.0
Powder River	59.4	130.6	33.0	190.6	118.0	266.6	80.6
Green River-Hams Fork	44.8	25.6	31.6	67.2	32.0	93.2	31.4
Fort Union	36.6	18.3	14.5	35.9	46.5	69.4	67.0
San Juan River	17.1	7.9	17.6	19.6	48.1	40.2	56.9
Uinta-Southwestern Utah	20.4	16.5	14.4	38.4	28.8	61.8	36.9
Denver-Raton Mesa	25.7	17.3	15.9	27.5	30.9	37.7	35.4

(a) Represents absolute values; other columns represent differences from 1976 base case levels.

TABLE 5-86

OPERATING ENERGY, COMPARISON OF ALTERNATIVES
(trillion Btu's)

COAL REGION	PROGRAM ALTERNATIVES										
	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
	1985			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	457.0	469.0	480.0	0	-0.226	0.30	-5.76	-5.77	- 5.52	-0.157	- 6.18
Central Appalachian	351.0	364.0	329.0	-0.180	-1.66	3.25	-0.210	-1.07	-15.0	-2.48	7.04
Southern Appalachian	106.0	141.0	165.0	-0.131	-2.76	- 1.95	-2.47	-1.12	5.72	-9.73	- 7.45
Eastern Interior	472.0	477.0	429.0	-0.194	4.81	-16.60	-0.637	1.09	-14.9	-6.42	9.89
Western Interior	169.0	200.0	210.0	-0.585	-3.89	7.78	-4.88	-3.76	- 4.38	-1.90	- 1.08
Texas	164.0	202.0	191.0	0	2.67	-16.6	-1.17	0.160	-13.7	-6.73	17.3
Powder River	190.0	250.0	326.0	-0.113	0.318	26.8	0.115	0.233	22.3	-0.179	-21.5
Green River-Hams Fork	70.4	112.0	138.0	0	4.65	32.1	2.04	1.10	38.6	37.8	-18.5
Fort Union	54.9	72.5	106.0	1.31	1.46	0.843	1.44	1.49	8.39	-9.57	8.04
San Juan River	25.0	36.7	57.3	0	0.243	0.423	0	0	5.92	-3.92	8.06
Uinta-Southwestern Utah	36.9	36.8	82.2	0	0.814	0.982	0.520	0.257	8.23	-4.27	0.116
Denver-Raton Mesa	43.0	53.2	63.4	-0.136	0.587	1.01	0.520	0.588	3.89	3.89	2.61
	1990			CHANGE FROM NO NEW LEASING VALUE							
Northern Appalachian	441.0	519.0	654.0	3.12	1.50	- 3.6	-0.54	- 0.478	- 0.985	5.71	7.06
Central Appalachian	350.0	405.0	461.0	0	-5.52	19.2	0	- 1.71	- 8.67	-5.24	15.3
Southern Appalachian	107.0	160.0	221.0	0	-0.947	5.99	0.65	- 0.192	7.16	-15.9	-19.1
Eastern Interior	602.0	708.0	779.0	-1.4	-16.5	-76.9	-2.81	- 6.01	-69.4	-19.2	74.2
Western Interior	185.0	300.0	383.0	0	-8.58	-40.0	-10.3	- 5.0	-11.5	-11.7	2.69
Texas	198.0	352.0	411.0	-1.09	-33.6	-50.4	-5.85	- 6.28	-63.1	-40.0	-11.8
Powder River	223.0	368.0	407.0	0.18	98 7	278.0	51.1	10.8	151.0	95.3	-37.7
Green River-Hams Fork	102.0	144.0	169.0	3.99	22.6	61.2	1.75	4.55	54.1	53.3	-37.9
Fort Union	69.4	119.0	173.0	0	- 8.63	-10.4	-3.22	0	3.72	-30.2	3.67
San Juan River	42.6	84.8	114.0	0.607	- 9.98	- 1.69	-4.43	- 1.04	1.42	7.82	4.51
Uinta-Southwestern Utah	51.3	87.6	119.0	1.06	- 7.02	- 5.43	-5.63	- 0.998	6.20	-26.6	-10.6
Denver-Raton Mesa	58.9	84.1	98.8	0.57	0.330	14.5	-0.13	- 0.539	0.831	-5.96	- 2.04

(a) Represent absolute values; other columns represent differences from the no new leasing base case.

5.4 IMPACTS RESULTING FROM SUBALTERNATIVES AMONG OTHER POLICY ISSUES

5.4.1 Introduction

Sections 5.1 through 5.3 of this statement discuss the preferred Federal coal management program and the major alternative programs. Those sections assume that different leasing strategies would cause different regional levels and distributions of coal production. All alternatives examined were designed to fully satisfy all requirements of existing Federal statutes.

A nationwide Federal coal management program is not, however, something that can be reduced to six or seven alternatives. At each stage in the process of managing Federal coal resources there are a variety of choices to be made—subalternatives concerning a particular issue—which usually are compatible with each of the major program alternatives previously discussed. Analysis of each combination of these various issue subalternatives would require analysis of thousands of alternatives. To make this task manageable and, more importantly, useful to decisionmakers and the public, Sections 5.4.2 to 5.4.10 analyze the subalternatives which, if adopted, could cause significant changes in the degree and distribution of environmental damage from the development of Federal coal. In most instances, the issues and subalternatives discussed here are those which the Department presented to the Secretary and Under Secretary as part of the process to designate the preferred program, and a fuller discussion of these issues is included in the papers presented to the Secretary and Under Secretary and summarized in Tables 3-2 and 3-3. Other subalternatives which have less impacts are discussed in the background papers. (See Section 3.3 which describes these papers and explains how copies can be obtained.)

Previously in this chapter, the Department quantified, where possible, the adverse and beneficial changes to the environment that the adoption of the preferred program and each of the major alternatives would cause, and described the quantitative significance of these changes. This portion of the chapter will consider qualitative effects for the subalternatives. Wherever possible, repetition of material presented elsewhere in this statement is avoided and only information needed to understand the subalternatives and their impacts is presented. Accordingly, the discussion in the following sections should be read in conjunction with the material presented previously in this statement. For each issue and its set of subalternatives, the following factors are discussed, where revelant.

- What environmental elements are most likely to be affected by the subalternatives?
- Does the choice involved affect all regions equally, or is one region more affected than another?

5.4.2 Require Underground Mining

One issue evaluated was the effect of limiting coal extraction on Federal leases to underground mining only. To implement this policy, two subalternatives could be adopted:

- Prohibit use of surface mining techniques on new Federal coal leases.
- Make no rule blanket concerning mining method except as required by the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977.

The western coal regions contain vast coal reserves of both underground and surface mineable coal. Despite the large underground reserve base, surface mining produces virtually all coal output in the Fort Union, Powder River and San Juan River Coal Regions. Underground mining produces virtually all of the coal in the Uinta-Southwestern Utah Coal Region. Surface mining accounts for approximately 30 to 60 percent of the production in the remaining regions. In 1976, an estimated 52 western underground coal mines produced 12 million tons and 61 western surface mines produced 97 million tons of coal. Table 5-87 presents projected percentage distributions of surface and underground mining under the preferred program. In general, coal produced by underground mining is more expensive and more capital and labor intensive than that produced by surface mining. Between 1950 and 1978, national coal production has gone from mostly underground to more than half surface mining. Industry efforts to reclaim lands disturbed by surface mining have also increased during this period. The Surface Mining Control and Reclamation Act requires intensive regulation of both surface mining and the surface effects of underground

TABLE 5-87

PERCENTAGES OF UNDERGROUND AND SURFACE MINING FOR 1976, 1985, AND 1990 PREFERRED PROGRAM, MEDIUM PRODUCTION PROJECTIONS

COAL REGION	1976		1985		1990	
	% Underground	% Surface	% Underground	% Surface	% Underground	% Surface
Northern Appalachian	52	48	69	31	79	21
Central Appalachian	61	39	72	28	77	23
Southern Appalachian	36	64	52	48	65	35
Eastern Interior	40	60	68	32	84	16
Western Interior	3	97	38	62	62	38
Texas	0	100	0	100	0	100
TOTAL EAST	50	50	62	38	72	28
Powder River	0	100	0	100	0	100
Fort Union	0	100	0	100	0	100
Green River-Hams Fork	1	99	5	95	7	93
Denver-Raton Mesa	78	22	56	44	67	33
Uinta-Southwestern Utah	100	0	84	16	86	14
San Juan River	0	100	5	95	3	97
TOTAL WEST	13	87	9	91	8	92

mining. Under the permanent regulatory program of the Office of Surface Mining Reclamation and Enforcement, no coal mining will be allowed unless, among other things, the surface area disturbed can be reclaimed to pre-mining productivity and approximate original contour.

Several other factors distinguish these two mining methods. Deep mining is more hazardous to the miners than is surface mining, both in terms of fatalities and injuries. Mine safety is comprehensively regulated by the Coal Mine Health and Safety Act, 30 U.S.C. Chapter 22. Surface mining recovers a higher percentage of coal than does underground mining. The degree of recovery differs according to the area and type of mining involved. Typically, the recovery rates are 70 to 90 percent for surface mining versus 29 to 85 percent for underground mining. The Federal Coal Leasing Amendments Act bars the Secretary from approving a mining plan which does not use the method of mining which achieves the greatest recovery of coal. Where both surface and underground mineable coal exist on a given lease, the Secretary must require the lessee to use the method which recovers the greatest amounts of coal. Statutory changes may therefore be needed to carry out a deep-mine only policy, although the Office of the Solicitor has advised the Department that it may authorize "single-seam" leasing which would permit the leasing of only those seams which are recoverable by underground mining methods.

Surface mining usually causes greater surface disturbance, sedimentation, erosion, wildlife loss, and displacement of competing land uses and users than does underground mining. The degree of disturbance caused by surface mining itself varies greatly depending on seam thickness. Table 5-88 shows that acreage disturbed is directly related to seam thickness. Land disturbance from underground mining in the form of subsidence is a potential long-term problem, particularly in shallow underground mining.

Since new leasing would not result in significant production until 1985 at the earliest, adopting this policy would not cause any significant changes to the environment prior to that time. Assuming that a program is adopted which would resume leasing, a limitation to underground mining production from new Federal leases would lower new production for the Fort Union, Powder River, San Juan River and Green River-Hams Fork Coal Regions (those which have mostly surface mining); increases in production from new leases would be most likely in those regions where Federal coal is already produced by underground mining (Denver-Raton Mesa and Uinta-Southwestern Utah Coal Regions, and in the non-Federal areas in the Midwest and East).

The reason for the effect is almost entirely economic. The surface mineable coal in those areas can be removed for as much as $8-$18 a ton cheaper than underground coal. The added costs are sufficient to have consumers seek coal elsewhere. The potential effects on western coal production from a restriction to deep mining could vary from insignificant to critical, depending on whether actual production reaches the low, medium or high 1990 projections. Under the no new leasing mid-level projection, surface mining is expected to increase 50 percent in the six western regions, from 339 million tons in 1985 to 514 million tons in 1990. (Refer to the no new leasing alternative for an analysis of the maximum restraint on new Federal coal leasing—a policy of allowing underground mining only on new leases can be expected to approximate that alternative in those regions where underground mining is not economically competitive with surface mining.) Table 5-89 presents comparable estimates of different effects produced through mining coal by surface and underground methods in one region. The same kinds of transfer of impacts from unleased Federal lands to lands already under Federal leases and non-Federal lands described under the no leasing alternative would occur in the Fort Union, San Juan River and Powder River and Green River-Hams Fork Coal Regions. These changes would not occur in the Uinta-Southwestern Utah Coal Region or in areas of Colorado that are suitable for underground mining. Some interregional effects are also likely to take place with production being ultimately lowered in the surface mining regions and increased elsewhere.

A less likely, but still possible, effect is that a deep-mining only policy would affect neither the amount nor distribution of production to any great extent, but would merely alter the method of mining. Although the cost differences between surface and deep mining of between $8 and $18 per ton do not readily suggest this will occur, the possibility cannot be totally ruled out. The produc-

TABLE 5-88

RELATION BETWEEN THE AVERAGE SEAM THICKNESS AND THE ACRES DISTURBED BY REGION

COAL REGION	SEAM THICKNESS (ft.)		ACRES DISTURBED/100,00 TONS	
	SURFACE	UNDERGROUND	SURFACE	UNDERGROUND
Northern Appalachian	6	4	9.52	14.29
Central Appalachian	5	3	11.43	19.05
Southern Appalachian	5	3	11.43	19.05
Eastern Interior	6	6	9.52	9.52
Western Interior	3	3	19.05	19.05
Texas	8	-	7.14	-
San Juan River	8	6	7.14	9.52
Uinta-Southwestern Utah	11	8	5.19	7.14
Green River-Hams Fork	8	-	7.14	-
Powder River	26	-	2.20	-
Fort Union	12	-	4.76	-
Denver-Raton Mesa	4	7	14.29	8.16

[a]Derived assuming 1,750 tons of coal/acre-ft. of seam, 100 percent recovery.

Source: Reference Number 71.

TABLE 5-89

ANNUAL ENVIRONMENTAL FACTORS ASSOCIATED WITH 10 MILLION TONS OF COAL SURFACE MINED OR UNDERGROUND MINED IN THE UINTA-SOUTHWESTERN UTAH REGION(a)

			Underground Mining	Surface Mining
Land Disturbed (acres)		Short Term	0	520
Water Make-Up (acre-ft.)		Evaporative	184	551
		Effluent	184	56
Air Emissions (Tons)		HC	0	45
		CO	0	234
		SO_2	0	30
		NO_X	0	385
		TSP	0	40
Population - Total			12,497	4,699
EMPLOYMENT	Construction	Direct	480	321
		Indirect	672	449
	Operation	Direct	1,970	600
		Indirect	2,758	839
Accidents			312	5.3
Fatalities			4	1.1

[a]Derived from the U.S. Department of the Interior Coal Impact Estimation Program (see Appendix H).

tion cost difference could be reduced by a variety of changes in current conditions, including new technology and lowered Federal royalties and state severance taxes.

If this were to occur, it would be expected that the major effects of the deep-mining only policy would be to exacerbate social costs in rural mining areas, since more employees would be needed to operate an underground mine rather than a surface mine. Per capita miner fatalities and disabling injuries would likely increase, and less coal resource per acre would be recovered. A deep-mine only policy would also require longer lead time and greater investments prior to production, in order to assure that the specialized training needed to develop a work force capable of safe and productive underground mining is accomplished. Experience indicates that safety records may show dramatic improvement where regulatory enforcement, worker participation in decisions about safety requirements, or company economic interests provide incentives for better safety efforts. Not withstanding the strict requirements of SMCRA, the deep-mine-only policy would also reduce adverse effects to wildlife, preserve existing surface environments, eliminate the risk of creating unreclaimed lands, and reduce total suspended particulates at or near the mine sites in the principal western regions where surface mining is predominant (Powder River, Fort Union, Green River-Hams Fork, and San Juan River Coal Regions). A deep mine only policy might also significantly undercut the policies expressed in Section 714 of SMCRA (see Section 5.4.6) since qualified surface owners have a right to withhold consent only for surface mining not underground mining. Arguments raised in the comment period on the draft version of this statement against adopting the underground mining only alternative include the following:

1. It would retard the mining of high quality, low-cost coal.
2. It fails to give weight to improvement in surface mining reclamation techniques required by SMCRA.
3. Lack of new leasing for surface mining may adversely affect ongoing mines that run out of reserves causing severe social disruptions.
4. The adverse social effects from increased population required to operate an underground mine exceed the harmful environmental effects from surface mining.

These are all valid points which were raised in the original discussion. The decision whether to adopt a policy of this kind calls for a weighing of these problems and benefits. The preferred alternative does not call for adoption of this policy.

The support for adoption of this policy in the past came mostly from those who believe western surface-mined lands cannot be adequately reclaimed. This point should be significantly allayed by the reclamation provisions in SMCRA.

5.4.3 End Use Considerations

Inclusion of limitations in new Federal leases that constrain the end uses of coal produced from those leases was another issue addressed in the coal policy review. Four subalternatives were evaluated:

- End-use considerations should be exercised during the leasing process to satisfy environmental goals and achieve energy policy objectives.
- End-use considerations should be allowed to enter the leasing process through special leasing opportunities afforded other departments and agencies.
- End-use considerations should not be part of a coal management program except as mandated by the Federal Coal Leasing Amendments Act of 1976 for "public bodies".
- End-use considerations should not be implemented, pending an opinion by the Office of the Solicitor on limits of the Secretary's authority.

The principal use of coal is electric power generation. The environmental impacts associated with coal mining and power generation vary greatly, depending on how and where the coal is consumed. The major categories are: mine-mouth power generation (at or near the mine), export (outside the mine area, but inside the United States), and foreign export (coal sent to another country). Consumption of coal at or near the mine site in the West tends to increase certain adverse impacts of coal development. Coal consumption requires large amounts of water, a resource which is already scarce in most of the West, particularly in the Colorado River Basin and in the Powder River Basin. Air quality can also be adversely

affected. Also, the construction of power plants causes large numbers of workers to migrate temporarily to rural areas, which may lead to boom-town economic and social problems. In some instances, coal that is exported from a state may be used to replace mine mouth coal in the destination area causing loss of employment and tax revenue there.

The Department has not historically regulated the way coal from Federal coal leases is consumed (except for coal for railroad purposes under Section 2(c) of the Mineral Leasing Act of 1920, (30 U.S.C. 202), and coal for municipalities under Section 8 of that Act (30 U.S.C. 208)) but Section 2 of the Federal Coal Leasing Amendments Act of 1976,(30U.S.C.201(a)), now requires it to do so for "public bodies". The Solicitor is determining whether the Department has legal authority to regulate end-use for purposes other than use by municipalities, public bodies, and railroads.

The Department of the Interior is not the only agency which might have a role in deciding how coal is to be used. The Federal Energy Regulatory Commission and state public service commissions or siting agencies exercise considerable authority over the location of new power plants. The Interstate Commerce Commission's approval is also necessary for rail lines and rates. The Interstate Commerce Commission intends to prepare an environmental impact statement in connection with Ex Parte 347, an investigation into western coal rail rates. The environmental impact statement will identify, examine and analyze the environmental consequences resulting from the use of western coal or the substitution of other fuels as well as the impacts associated with use of alternative kinds of transportation. Also, Section 125 of the Clean Air Act establishes a process whereby utilities can be barred from using other than local coal. Proceedings to invoke this clause have begun in Ohio and in Illinois.

Assuming that new leasing takes place, virtually every aspect of the environment could be affected by the first subalternative (application of end-use stipulations in leases).

The subalternative of controlling end-uses through lease terms would not, however, necessarily lead to a single policy objective. The following sometimes mutually exclusive or conflicting controls could either be adopted as a general rule, or be applied in particular instances, possibly at the request of a state governor. To prevent replacement of eastern and mid-western coal by western coal, a lease stipulation could prohibit a company from shipping the coal more than a specified distance or from selling it to be burned in certain states. If other western coal were not available to substitute for the use-restricted coal, this subalternative would lower western production and reduce environmental impacts in the western regions. Most likely to be affected by this subalternative are the Powder River and Green River-Hams Fork Coal Regions, which are the principal western sources of export coal to eastern and midwestern markets. Lesser effects would occur in the Uinta-Southwestern Utah Coal Region which now supplies some coal to plants in states such as Ohio and Indiana and in the San Juan River Coal Region which supplies coal to Texas. As the high moisture content of the lignite reserves of the Fort Union Coal Region limits that coal's usefulness for export, that region would be relatively unaffected. This subalternative could have impacts in the eastern and midwestern regions if it causes production increases in those regions. Employment and environmental impacts would increase. Finally, it could also cause a shift in how western coal is transported to other markets. The subalternative only involves shipment of the coal. It could cause companies to mine and burn the coal in the West and transmit the power to eastern and midwestern markets. Because of the energy loss in power transmission, more coal production would be needed to produce the same amount of electricity to consumers than would be needed if the coal were shipped by rail. The subalternative might also create new markets for coal gasification and liquefaction.

To minimize use of water, reduce coal-related population increases, and protect air quality in the producing regions, a lease stipulation could prohibit the consumption of the coal from a Federal lease in, for example, the state where it is mined, unless a specified percentage of the power would be used by customers in that state. Again, assuming that this subalternative is effective and that it changes the locus of power production facilities, adoption of this stipulation would retain water for agriculture, grazing, wildlife, and other competing industrial uses to a larger extent than would the absence of any end-use controls. It would also hold down population increases in

areas with small baseline populations, and would relieve concomitant adverse social and economic impacts, including those on housing, law enforcement, schools, sewage treatment, and the like.

If the lease stipulation applies to coal shipped to the West, as well as to the East, it could affect rather severely power production plans in Washington, Oregon, and, to some extent, California, since only western coal is a reasonable, cost-effective source of coal supply for these states.

The subalternative would also shift pollution and water use problems associated with coal conversion closer to areas where electricity would be used, and would require more costly long distance transportation. On the other hand, it would reduce the adverse environmental impacts which result from extensive power transmission lines through sparsely populated areas. It trades savings of social impacts, water use, and loss of power from transmission lines for impacts associated with rail transportation.

It is difficult to forecast with any reasonable precision how significantly the Department could affect utility plans to site power plants on the basis of stipulations in new leases. Depending on a variety of other factors, the actual change in power production patterns could be insignificant. The Department's ability to carry out these policies independently of other agencies varies from region to region. It is the highest in the Uinta-Southwestern Utah Coal Region because of very high Federal ownership of the coal resource and the land over which powerlines must be located (to remedy the lack of an adequate existing rail transportation and power transmission infrastructure). To a similar but lesser degree, the same conditions prevail in the San Juan River Coal Region. The Department has less control through this kind of stipulation in the Fort Union, Powder River, Green River-Hams Fork and Denver-Raton Mesa Coal Regions because the Federal share of both the coal and surface resources is less.

The Department could also decide to combine the previously discussed lease stipulations, and prohibit both long distance rail transportation and mine-mouth power generation for out-of-state consumption. The combined alternative would be the most restrictive approach possible and, if applied to *all* new Federal leases, would greatly limit new leasing.

Cooperative efforts to optimize power plant siting decisions offer a less direct, but potentially an equally effective way to deal with power plant siting problems. For example, Utah is rich in relatively high Btu, low sulphur underground coal that can often be mined with a comparatively small amount of environmental disturbance. It is equally rich in recreational resources, including a variety of national parks and wilderness areas. Utah is receptive to industrial development and employment opportunities, if they can occur without undue adverse environmental changes. How to transport and burn this highly desirable coal resource without destroying the natural features of the State is a highly complex problem. The Department of the Interior and the State of Utah have been closely cooperating to find appropriate sites for plants that will minimize employment, air, and water problems. A decision not to adopt an end-use stipulation is not, therefore, a commitment to unrestricted, deleterious coal development. Formal and informal cooperative efforts can accomplish many of the same results.

To encourage development of new technology, either for DOE projects under Section 908 of the DOE Act, or for privately financed projects, a lease stipulation could require the coal in the lease to be developed by a particular mining method (such as in-situ gasification) to protect lands that offer high potential for a new technology.

Although the Department has not made a detailed investigation of lands potentially suitable for new technologies, there may be lands, because of economic or environmental conditions, that can be mined not only by conventional methods, but also by new mining techniques including in-situ gasification or hydraulic mining of steeply pitched coal seams. Unless a lease stipulation requires a particular form of development, the opportunity to use such techniques could be lost. Opportunities for use of this stipulation are, like many of the technologies it may foster, largely speculative.

Controlling end-use as a consistent policy would cause fundamental changes in how the Department leases coal. The Department does not now "package" its coal leases for any particular buyer or purpose. It offers the coal, and whoever is the high bidder receives the lease. Consider a lease sale for a tract in Wyoming, for example. One bidder may want to mine the coal to sell it for

power generation in the same state. Another bidder may prefer to export the coal to Texas. Other bidders may have buyers in Minnesota and Illinois. As it is often difficult for a mining company to sell coal before it has the right to develop it, still other bidders may not have any customer under contract, but will want to obtain reserves to begin negotiations for customers. As a result of this, under the current policy, the Department's main role is to examine the impacts of coal development at or near the mine site and, for analytical purposes only, to hypothesize where and how the coal might be consumed. This market-oriented system is compatible with the competitive bidding aspects of the Federal Coal Leasing Amendments Act of 1976. A change in this system to accomodate end-use requirements might have significant effects on competition by limiting the numbers of bidders in a sale. This could cause changes in energy costs to consumers.

In the extreme case, under an end-use control policy, the Department would match a particular parcel of land with a particular project. The moving force for coal lease sales would be the company that would use the coal, not the company that would mine it. The Department would attempt to assist the user company to put together all the factors — obtaining a source of water, gaining access rights, acquiring of surface owner consent, ensuring availability of transportation — necessary to bid for and to develop a lease. This would, of course, eliminate much of the uncertainty which exists in a competitive bidding system; it would allow the Department to be confident that the coal it leases would be developed, and that the environmental effects of the entire coal development cycle would be scrutinized. It would also require the Department to acquire planning capability on a scale far in excess of that which it presently possesses. Substitution of Federal authority and decision-making for choices and plans now made by industry and by State and local governments would be a substantial change in traditional Federal responsibility. The consequences of such an increased Federal role would likely be more significant to political and economic relationships in our society, than to the environmental values and standards which are within the scope of this statement.

Some comments raised during the comment period on the draft version of this statement concurred with the Department's evaluation that adopting this policy would be a departure from past practice. Arguments against adopting an end-use alternative suggested that end-use controls would increase administrative costs and lower competition for coal, and that increased control would not have more desirable results. The administrative cost point is almost certainly correct. The assertions that competition would decline raising the cost of coal to consumers is clear in most, but not all, situations. Some of the end-use alternatives (such as restricting where coal could be burned or how far it could be transported) would be expected to raise fuel costs to some degree, if the restrictions affected distribution to points of consumption that were economic and if the remaining coal available to meet that demand was limited. Some end-use alternatives could have the reverse effect. One comment suggested that the current system raised coal prices to the consumer where (1) a single company was likely to be able to economically use coal from a particular area and (2) there was a lack of competing coal. For example, assume a situation where coal could be supplied to Utility X from area A for 10 dollars a ton but from all other areas for 15 dollars a ton. Under the current leasing system a utility might expect to pay just under 15 dollars for coal from area A. The comment suggested that if the Department leased the coal from area A and specified that Utility X would have a right of first refusal to purchase the coal from the lessee, the price that the utility could obtain might be significantly lower.

In weighing the advantages of this policy, it must be remembered that the same kinds of stresses on social, economic, and government systems that occur in the West, and that might be alleviated by end-use controls, also take place in the East. Prior to adopting a general end-use policy of exercising end-use control in a specific case, the Secretary would have to weigh competing values such as this. Finally, we note that the Department cannot unilaterally decide power plant location. The Congress has given the Department the duty to respond to applications to use particular BLM-administered lands for power plants. If the plants do not meet the standards set by the Congress, or the regulations adopted by the Department, the plant cannot be located on BLM lands. A company is always free to seek to locate its plant

on non-Federal lands. As previously noted in the text above, the Department lacks direct control over this issue. Private landowners, state regulatory agencies, and other groups must continue to make these decisions.

5.4.4. Concentration of Federal Leases

In the past, the Department has made little, if any, effort to examine current production patterns prior to leasing, even though decisions about the distribution of production within a region can influence overall effects almost as much as decisions on quantities of production. Similarly, no state or region has had an effective government planning organization that has long-range plans to optimize location of new mines, although some states have recently passed siting laws for mining activities on private lands. Although coal companies have obtained coal development rights, including Federal leases in a wide variety of areas throughout the West, primarily because of economic considerations (including those related to coal resource quality and transportation availability), western coal development has tended to concentrate in a few areas. Development is now concentrated in the Colstrip and Decker areas in Montana, in the Gillette to Douglas corridor in eastern Wyoming, in south central and southwest Wyoming, in parts of Emery and Carbon Counties in Utah, near Farmington in New Mexico, and near Craig and Delta in Colorado.

In addition, because of the new requirements of Federal laws, the Department must have a reasonably high degree of data collected, rehabilitation considered, and land-use planning done before it can lease. One consequence of the existing development pattern is that the needed information tends to be most complete and accurate in areas where development has taken place in the past. The Department is better prepared to lease in those areas, without requiring new data to be gathered and analyzed.

Another set of subalternatives concerns the limitation of new leasing to areas already producing coal. Specific subalternatives which could achieve such concentration include:

- Adopt a preference prior to planning that (1) new leases be issued only near existing production (concentration), or (2) new leases be issued in areas which would not have such concentration (dispersal)
- Adopt no preference but take these factors into consideration in the tract selection process.

The principal benefits that could occur in terms of the major areas of environmental consideration are associated with the socioeconomic aspects of a particular area, rather than the physical or biological aspects. Concentrated development could allow for centralization of requisite planning efforts within a single county or small number of counties in a region. This could in turn allow for uniformity in regional planning that would not necessarily occur with random dispersion of development. Planning efforts could be directed toward a new community or the expansion of an existing community, which would be the focal point of support for the concentrated development. Housing and community services would be centralized and could potentially benefit from the economies of scale of a single larger community, as opposed to a scattering of smaller communities. Services such as schools, police and fire protection, and waste handling could potentially be provided at a greater level of efficiency and effectiveness through centralization of efforts. Concentration can also reduce costs for agencies which enforce environmental standards on leases, and costs for monitoring compliance with air quality standards. Beyond certain levels, however, the effects of concentration could bring significant disadvantages to a community as discussed in Sections 5.3.4 and 6.3.1 of this statement.

Development in existing areas will be accelerated if new leasing is needed and current nonproducing areas are not available for development. Concentrating leasing could eliminate the need for, and perhaps the economic viability of, new transportation systems. Assuming the policy is coupled with new leasing of any magnitude, it could worsen problems in some areas which have been experiencing recent rapid development. In other areas, concentrated development could take advantage of, and even provide economic reinforcement to, those public and private investments that have been made to accomodate demands caused by initial coal developments.

The effects of development concentration on the physical and biological facets of environmental resources would depend on specific circumstances. The amount of land disturbed within a region as a result of adopting the concentrated development

subalternative would generally be less because transportation and other supporting or ancillary facilities would tend to be fewer. Rail lines, haul roads, power lines, borrow pits, and other facilities could serve multiple mines. Concentrated development, however, could produce levels of impacts which could seriously affect air or water quality or could add significantly to the water demand within a local area. The levels of air pollutants associated with concentrated development could lead to the violation of air quality standards within a region. This has been the case in the Colstrip area of Montana, where concentrated development has produced particulate levels that exceed national primary air quality standards. Similarly, potential water pollutants would more likely be directed toward a single water system with concentrated development, thereby increasing the probability of producing significant adverse impacts on water quality, or requiring significant treatment costs. The increase in water demand associated with such development could potentially exceed the development area's supply, or could preempt development associated with other water uses within the area due to the water requirements of concentrated coal development. The potential for effects on biological resources is basically dependent on habitat disturbance, and the amount or area of such disturbance would be approximately the same with concentrated development as with dispersed development. In areas lacking an established rail transportation network, a scattered development policy may actually preclude development of coal resources for other than mine-mouth conversion. Major rail extensions typically cost in excess of $1 million a mile to build [63]. Revenues generated from transporting coal from a single, moderately-sized mine may be insufficient to amortize the extensive cost of a major rail extension. Should the extension be financed by a coal company rather than a rail common carrier, the added expense may make the coal uneconomical to a distant electric utility or other consumer.

The advantages and disadvantages of this subalternative are somewhat subjective. While the issue has been extensively discussed outside the Department, its resolution is unclear. The Secretary preferred assessing the social and environmental effects of locating a mine when selecting each tract for a lease sale, without establishing a locational policy which automatically favors concentration or dispersal. This assessment would be made in the tract-ranking process in the preferred program.

5.4.5 Due Diligence

Diligent development and continuous operation regulations discourage companies from failing to develop Federal coal leases, minimize inefficiency and wasted effort in planning for coal leasing and production, and help ensure that the government will receive fair market value for leases. In the past, the Department included in leases minimal diligence and continuous operations requirements, but did not exercise stringent enforcement. Due to this policy, economic and other conditions affecting western coal development have resulted in the vast majority of Federal coal leases not producing any coal until very recently.

The Congress, in the Federal Coal Leasing Amendments Act of 1976, strongly affirmed that diligence is to be a major factor in any Federal coal management program by mandating the strict application of diligence standards.

In May 1976, the Department adopted new diligent development and continuous operation regulations which require all existing leases to produce at least 2-1/2 percent of the lease reserves by 1986 (with an extension possible for an additional five years under limited circumstances). New leases are required to produce 1 percent of the deposits within 10 years after lease issuance. By statute, a company that receives a new lease must also submit a mining plan within three years from lease issuance. Since those regulations were enacted, there has been significant movement toward activity on these leases (see Section 2.7, which describes likely production from existing leases).

The Department considered several due diligence subalternatives; however, it no longer has the authority to revise diligent development and continuous operation regulations. The Congress transferred that authority to the Department of Energy in the Department of Energy Organization Act.

The specific due diligence subalternatives considered by the Department include:

- Continue existing standard of producing one percent of reserves by the end of the first 10 years, a minimum of one percent each year thereafter, and total exhaustion

of all reserves in 40 years after a mine plan is approved.
- Raise or lower initial 10 year production period.
- Raise or lower total 40 year production time.

Major coal mines in the West require at least three years after lease issuance to be in production under the best of circumstances; five to seven years is not unusual. Any effort to reduce diligence below these time frames would create management problems which could frustrate a situation totally unrelated to the purpose of diligence. In addition, coal companies, like other mining companies, have some need to maintain an "inventory" of uncommitted coal reserves. This inventory serves as protection against rising resource costs and gives the companies assurance that they have the resources to enter markets as they develop. To some extent, the long-term coal market, particularly in times of high demand, dictates that a supplier have assured reserves before a customer will commit itself to a binding contract.

The effect of different diligence standards could make a short period for initial development an impediment to effective planning and community capital construction. A significant shortening of the initial diligence period (say to five years) would probably make it very difficult for many operations to commence. Companies may only have time to do initial site preparation before the lease would terminate. This would cause the companies to layoff the initial work force; and preparation for development, such as new roads, housing, school construction, sewage facilities, etc., would be wasted. If the time period were too short, the risk of development might be so great as to discourage otherwise reasonable development.

A significant lengthening of the time for initial production (say to 20 years) would ensure that all planned production would have adequate time to take place in an orderly fashion. If all production tended to be initiated toward the end of this extended period, it could also facilitate community planning by increasing the time from lease issuance to land disturbance. In this longer time period, more capital construction could take place, workers could be trained, and similar pre-mining activity could commence. There is no guarantee, however, that this would actually happen, and, in fact, all production might still occur within 10 years of lease issuance. Expanding the period would also give companies more time to develop complex or new projects. It has been suggested for example, that a 10 year initial production period is insufficient for the development of a lease by a synthetic fuels firm. Any extension of the 10 year period for new leases would require legislation.

A significant increase in the continuous operation rates (i.e., to require total extraction in 25 years) would have two tendencies: either the production rate from each lease would tend to be increased, thereby lowering the total number of producing leases and concentrating the effects of development in a smaller area (i.e., a 100 million ton deposit would be mined at a four million ton per year rate instead of a 2.5 million ton per year rate); or the total number of mines would remain the same, but the period of mining would be shortened by 15 years. The Department can control which alternative results through its tract selection policies. In the preceding example, if the Department wished to see accelerated development on a single lease, it would lease to set up a logical mining unit of 100 million tons; for a lower rate of development, it would lease to set up a logical mining unit of 62.5 million tons. If the 40-year period were reduced to a 25-year period of coal development, this would reduce the number of years for which a commitment to development was made. With this more limited commitment, the Department could reevaluate whether, at an earlier time, it wished to continue the pattern of development. It would give the Department greater ability to respond to changes in demand for Federal coal. The impacts of this earlier reevaluation (25 years rather than 40 years after lease issuance) are entirely speculative at this time. Policies of periodic leasing tend to diminish any benefits. If the subalternative were carried out to change the yearly development rate, environmental impacts on a particular parcel of land would be concentrated. More acres would be disturbed on the leasehold in any particular year. This might increase problems for effective wildlife management, dust control, rehabilitation, erosion, and sediment loading in streams. On the other hand if few leases were needed, the adverse effects of dispersed leasing might be lessened.

The effects of these possible changes in the diligence policy will be most clearly felt in the coal regions most likely to require more leasing:

Powder River, Green River-Hams Fork, and San Juan River.

5.4.6 Land Ownership Patterns

Land ownership patterns are very complicated in both the West and the East. In the West, vast amounts of land are owned by private, Federal, state and Indian interests. Over six million acres are privately owned, with the mineral estate Federally-owned. Table 2-5 summarizes ownership figures in the KRCRAs.

Because of railroad grants, large amounts of land, including land which is valuable for coal, is held in checkerboard patterns, with alternate sections owned by the United States and private owners. This checkerboard pattern is most prevalent in the Fort Union and Green River-Hams Fork Coal Regions and in the northern portion of the Powder River Coal Region. Small checkerboard areas also exist in the San Juan River Coal Region. It has been estimated that over 300,000 acres of the privately owned portion of the checkerboarded lands have been committed for coal development.

In a very large number of townships in the West, states own sections 16 and 36. The United States transferred this land under the school lands grant programs established in the Statehood Acts.

Both the checkerboard patterns and the school land patterns are in 640-acre units. Coal in these areas, however, can rarely be mined in contiguous areas of less than 2,000 acres. Consequently, areas with these ownership patterns cannot be mined efficiently, if at all, without approval from more than one entity.

The Congress, in Section 714 of the Surface Mining Control and Reclamation Act of 1977, has given farmers and ranchers who own land situated over Federally-owned coal deposits a veto power over leasing for surface mining if they meet certain qualifications and have not previously consented to surface mining (see Sections 1.3 and 3.2.5.1). Split-estate land owned by persons who do not meet the standards in Section 714 may be leased for surface mining; and all split-estate land may be leased for underground mining without the surface owner's consent, if a bond is posted to cover the cost of damages to crops and improvements, among other things, in accordance with the law under which the United States sold the surface estate (see Section 3.2.5.1).

The various owners of tracts in checkerboard areas have not only direct but also indirect, veto power over coal development by their ability to affect access, water rights and other elements needed to develop a coal lease. The control or ownership of adjacent, privately owned properties is also important because it often gives the controlling company some advantage in the competitive coal lease sale. The advantage stems from better resource knowledge, coupled with the certainty of cooperation from the surface owner. This problem is minimized where the mineral owner is willing to share resource information with others, or engage in joint ventures with the development of Federal lands.

Leasing decisions based on surface ownership patterns could produce significant variations in environmental impacts. Specific subalternatives considered in this context include:

- Do not take surface ownership into consideration when leasing, except as required by the Surface Mining Control and Reclamation Act.
- Do not lease unless the Federal Government owns both the coal and the surface estate.
- Do not lease in "checkerboard" areas.

The subalternative of not leasing unless the Federal government owns both the coal and the surface estate (an alternative which was considered during the development of SMCRA) would not be likely to change significantly development patterns in either the Uinta-Southwestern Utah or San Juan River Coal Regions, since approximately 85 percent of all coal in KRCRAs in those regions is overlain by Federal surface. The subalternative has the potential for significant change in the Green River-Hams Fork Coal Region since over 60 percent of the coal there is privately owned. The subalternative would have its greatest effect in the Fort Union Coal Region, where 99.8 percent of all Federally-owned acreage in North Dakota and 87 percent in Montana is overlain by private surface. The Powder River Coal Region would be similarly restricted.

If new coal leasing is needed to meet demand in these regions with significant split estate land patterns, this subalternative could limit the ability of the government to meet this need. The Department specifically studied this question in two areas. (It should be emphasized that these studies

did not measure the impact of providing surface owner consent to that limited number of ranchers and farmers protected under Section 714 of the Surface Mining Control and Reclamation Act, but dealt instead with the much broader question of foregoing leasing under all non-Federal surface.) For southern Campbell County, Wyoming, this subalternative would eliminate from consideration for leasing over 11 billion tons of Federally-owned coal, leaving only 2.6 billion tons available (Figure 5-7). These 2.6 billion tons could be further reduced by the application of unsuitability criteria or other environmental restrictions. Figure 5-7 indicates that the maximum yearly production rate, assuming a 40 year mine life and annual production of five million tons a year, from this reserve would be 51 million tons per year. To the extent this is not sufficient to meet the demand, production above that level would either be transferred to existing Federal leases or to private lands, either within or outside the region. Since the coal in this area has the thickest seams in the United States, and a well-developed transportation network, the net effect of this policy could be to increase the total acres of land disturbed by mining, and to create pressure for construction of new coal transportation networks elsewhere in the West.

The Department also estimated that this subalternative could constrain development in the Decker-Birney Planning Unit in Montana in the northern part of the Powder River Coal Region. Again, as in the Campbell County, Wyoming, area, the Decker-Birney Unit has vast coal reserves, and, in parts, a developed rail system. It is the site of ongoing coal development. As part of the Department's task force on developing land unsuitability critera, a field test was done in the Decker-Birney Unit to determine how much coal would be available for leasing. Figures 5-8 and 5-9 present estimates of the amount of Federally-owned strippable coal deposits in the Decker-Birney Planning Unit. Lands potentially available for lease were identified after applying the most stringent of the alternative suitability standards (including some which the Department later modified to be less stringent) in two ways: (1) without regard to surface ownership and (2) excluding all coal underlying non-Federal surface. Under the first assumption, eight deposits of 400 million tons or more, two deposits of 150 to 400 million tons, and nine deposits of 20 to 150 million tons were identified as potentially available for leasing. Under the second assumption, only one deposit of 400 million tons, none from 150 to 400 million tons, and eight from 20 to 150 million tons remained. As in the Campbell County, Wyoming, example, the amount of land available for coal leasing would be significantly reduced under this subalternative.

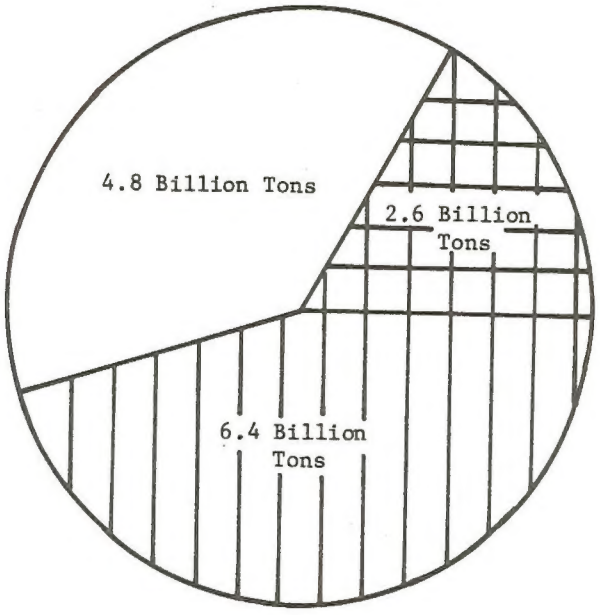
The work done in these two areas appears to be transferable to areas with similar surface ownership characteristics. The studies did not attempt to make any specific findings as to whether the overall impacts of developing the Federal surface versus private surface lands were significantly different in these areas.

The exact effect of shifting leasing to land where both the coal and the surface estate are Federally-owned, compared to land with Federal coal and private surface, or private surface and private coal, is unclear at a general level such as this. Totally private surface and mineral estates, particularly in Wyoming and Montana, tend to concentrate in river and stream valleys and along major highways as compared to estates having whole or partial Federal interests. Similarly private surface estates overlying Federal coal tend to be in these same areas as compared to Federal surface. Except for areas such as southern Campbell County, Wyoming, Federal surface lands and Federal coal would then tend to be in areas further from existing transportation, in rougher topography, less intensively used, not in alluvial valleys or flood plains, and the like. Private lands, including railroad lands, also tend to be closer to towns and roads. Development in all Federal areas would tend to increase the need for new infrastructures. More detailed information on these issues is available in several recent coal studies, including those listed in Table 1-1, and the Northern Great Plains Resource Program.

In the long run, this subalternative would also tend to distribute coal development more extensively in areas where the land and coal are entirely Federally owned. The social and economic consequences of a subalternative that prohibits leasing under non-Federal surface would be substantial. Such a subalternative would not give significant additional protection to those ranchers and farmers whose property rights are already safeguarded under the Surface Mining Control and Reclama-

RESERVES CLASSED BY
SURFACE OWNERSHIP STATUS: SOUTHERN CAMPBELL COUNTY

(Unleased Federal Coal)



13.8 Billion Tons Total

MAXIMUM ANNUAL PRODUCTION POTENTIAL: CONTIGUOUS BLOCKS
OF 100 MILLION TONS OR MORE

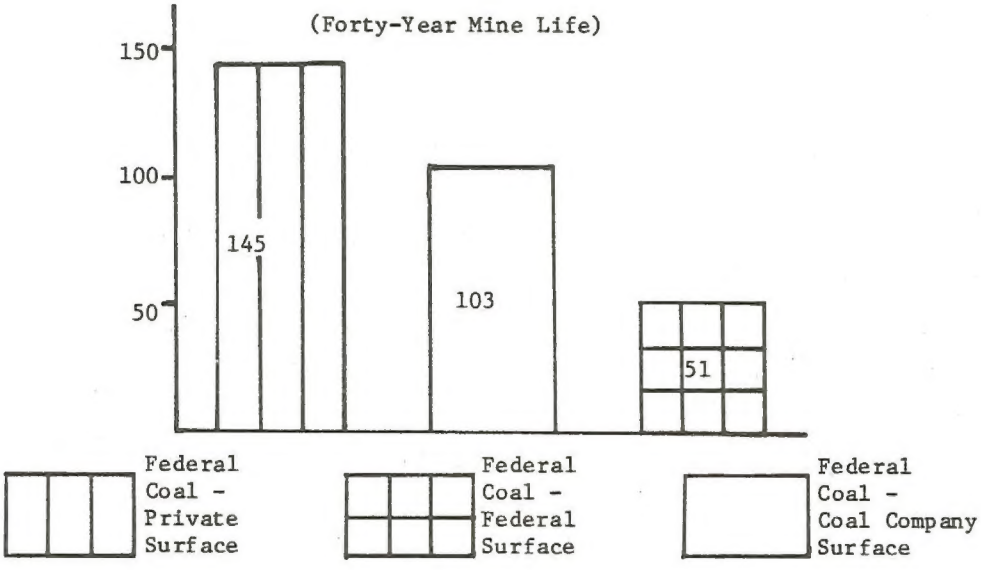


FIGURE 5-7

RESERVES CLASSED BY SURFACE OWNERSHIP STATUS AND
MAXIMUM ANNUAL PRODUCTION POTENTIAL

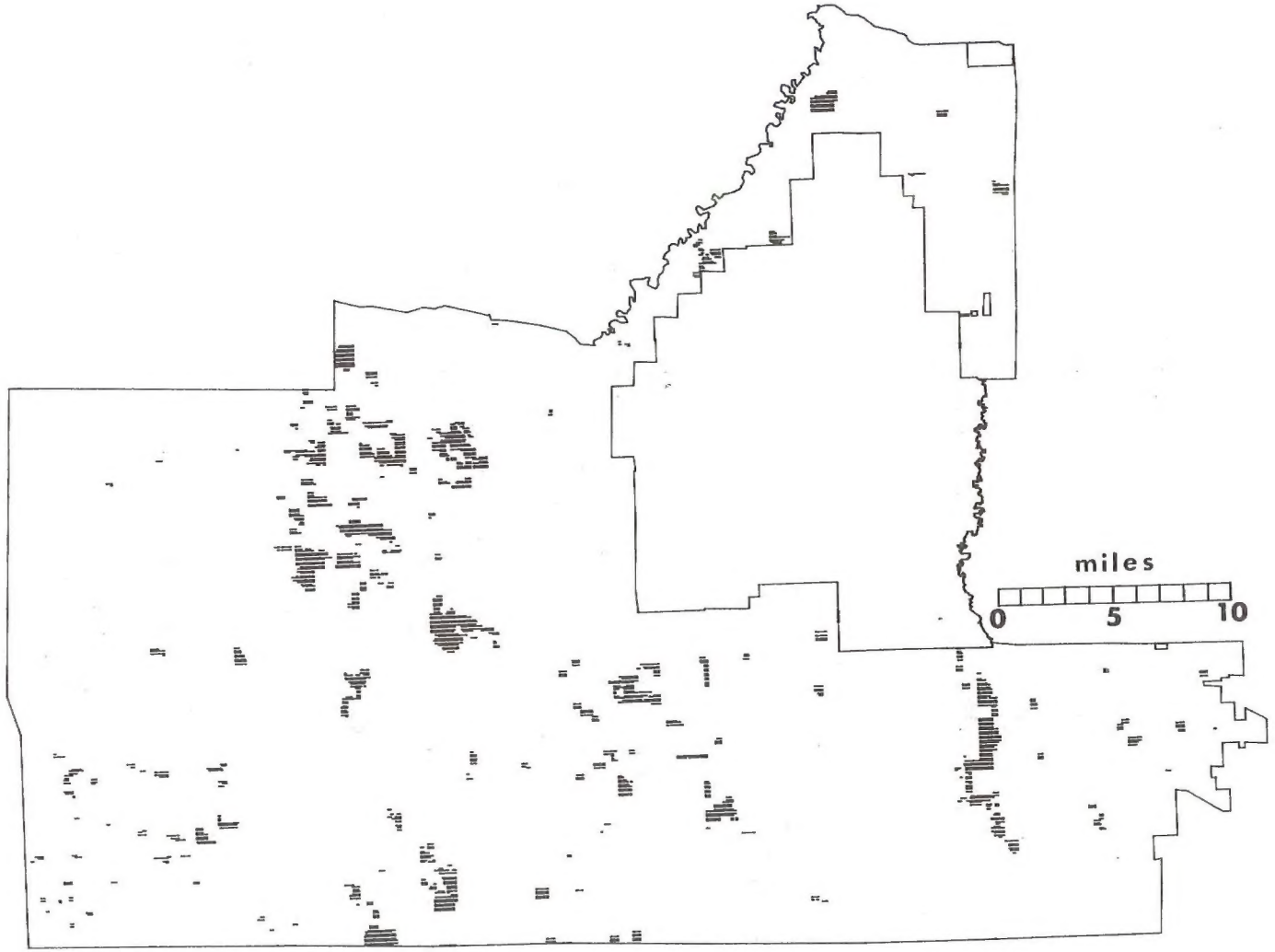


FIGURE 5-8

FEDERAL STRIPPABLE COAL DEPOSITS: DECKER BIRNEY PLANNING UNIT
ALL TESTED SUITABILITY CRITERIA INCLUDING SURFACE OWNERSHIP

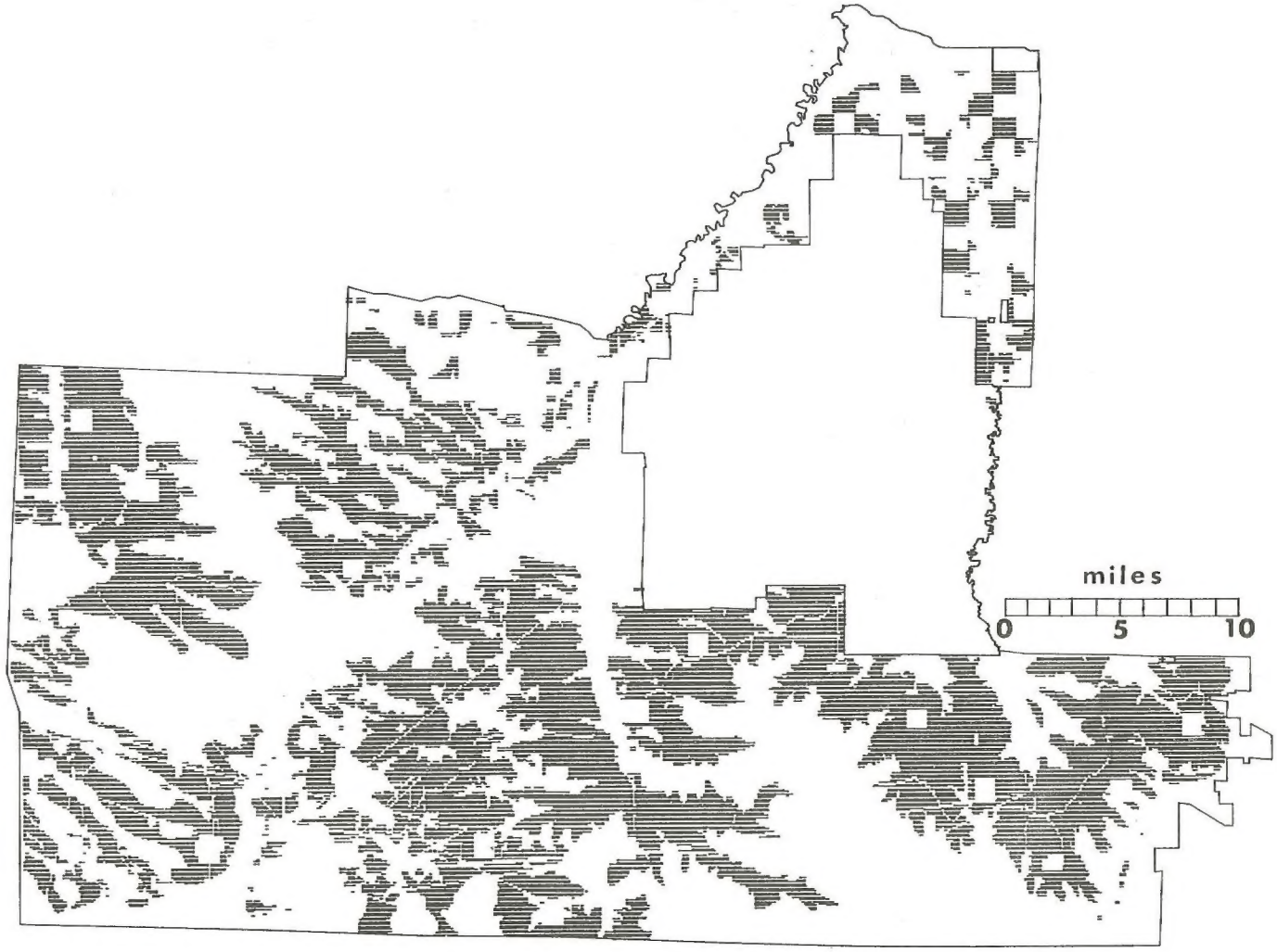


FIGURE 5-9

FEDERAL STRIPPABLE COAL DEPOSITS: DECKER BIRNEY PLANNING UNIT
ALL TESTED SUITABILITY CRITERIA EXCEPT SURFACE OWNERSHIP

tion Act, and would eliminate the prospect of cooperation by any non-Federal landowners, including those protected under that Act, and all others who are willing to assist in the development of Federal coal under their lands. In some areas, coal production would not be possible, and those residents who anticipate increased employment opportunities and the other economic changes associated with coal development would not experience such changes.

In other areas, mining on Federal surface could cause social and economic changes that would be experienced by all residents, and the ban on mining of private surface would simply deny some landowners the opportunity to participate in personal economic benefits from Federal coal development in their area.

A less extreme version of this policy - - to allow leasing if the surface were owned by a coal company or a party who did not farm or manage the land for grazing - - would nearly double the southern Campbell County, Wyoming lands available for leasing. This dramatic increase in land availability might not occur in other areas of significant private ownership, since coal companies and investors have long recognized Campbell County as a prime coal area. The Department does not have accurate figures at this time for other areas. Purchases and other ways to control the surface are likely to be more prevalent in Campbell County than in other parts of the West.

The subalternative of not leasing in checkerboard areas presents similar problems. The principal effect of this subalternative would be to forestall development of the coal lands in both the Federal and non-Federal portions of the checkerboard areas where the Federal coal is now unleased. Department estimates indicate that 42 percent of the total coal reserves (Federal and non-Federal) in the Fort Union Coal Region, 16 percent in the Powder River Coal Region, and 27 percent in the Green River-Hams Fork Coal Region would likely be incapable of development without Federal leasing. Other regions have few or no checkerboard areas and would not be changed by this subalternative. The subalternative would eliminate mining in checkerboard areas since relatively little Federal coal has been leased in those areas. Some coal in checkerboard areas may be developed in conjunction with state lands but, in general, mining of coal in the checkerboard areas would be greatly limited. With the exception of the Fort Union Coal Region and possibly in the Wyoming portion of the Green River-Hams Fork Coal Region, there is probably sufficient coal in non-checkerboard areas to meet foreseeable coal needs from Federal reserves and non-checkerboard private reserves.

The environmental effects of this subalternative are difficult to estimate. The checkerboard areas tend to have better transportation access to rail lines than non-checkerboard areas. The effect of this subalternative may be increased environmental disturbance to build new transportation facilities. Similarly, vegetation distribution and wildlife habitats may vary from checkerboard areas to non-checkerboard areas. The overall environmental impact on these lands as compared to Federal surface or other private surface is not clear. Particularly at low leasing levels, it is likely that equally attractive tracts could be found in both types of land-ownership areas.

The adoption of this subalternative would also have competitive implications. The Justice Department has recommended that the Department of the Interior proceed to ensure that the railroads' control of these lands will not have anticompetitive effects. Further discussion of this aspect of the land ownership subalternative may be found in the May 1978 Annual Report of the Justice Department.

Failure to adopt either of the subalternatives on a program-wide basis would not foreclose the Department from adopting them on either a regional or lease-by-lease basis. Land ownership could, and would in the preferred program, be a factor in tract ranking. Both the land use planning process and the tract delineation and ranking process in the preferred program will give the Department the opportunity to compare the environmental impacts of developing lands with different surface owners.

5.4.7 Maximum Economic Recovery.

Prior to the enactment of the Federal Coal Leasing Amendments Act of 1976, the Department did not have either a statutory mandate or extensive formal guidelines or regulations to assure that coal reserves would not be lost as part of a mining operation, particularly for surface mining operations. The Geological Survey has enforced standard principles of resource conservation as

part of its oversight responsibilities on Federal coal leases. The Congress, in the 1976 Act, added two specific requirements to improve coal resource recovery. First, prior to issuance of a lease, the Secretary is directed to consider and compare which method or methods of mining will result in the "maximum economic recovery of the coal in the proposed lease tract". This determination is not binding upon the Secretary or the lessee. Second, the Secretary is prohibited from approving a mining plan which does not achieve the maximum economic recovery of the coal in the leased tract. Congress' goals in enacting this provision were to prevent waste of coal resources and to minimize environmental damage from mining by assuring that all economically recoverable coal would be mined so that a second mining operation at some later date would not be necessary. Three subalternatives concerning Maximum Economic Recovery (MER) have been considered.

- MER is evaluated seam-by-seam. (The lessee must mine and recover coal from each profitable seam.)
- MER is evaluated on all seams. (The lessee must mine and recover coal from all seams which are collectively profitable excluding seams technically or environmentally unrecoverable.)
- MER is limited to a decision only on what mining method or methods are to be used, and the decision on which seams are to be mined and recovered is one based on sound resource conservation principles.

The subalternative the Department chooses will affect recovery in both surface and underground mines. In surface mining, it could affect the stripping ratio to which a company will have to mine; companies may be required to recover coal under greater depths of overburden. Companies may also have to mine deeper seams than would otherwise be done in surface mines. In underground mines, it may affect the number of seams to be mined, the equipment to be used, the depth of mining, and the amount of coal in each seam that is mined. In all instances, the most likely effect of a decision to apply a strict MER standard is to prolong existing mining operations or increase yearly production rates of those operations, or a combination of the two. This should, to some extent, increase the production from already opened mines and diminish the need to open other mines.

The first two subalternatives considered for MER, which involve the economics of an operation, impose additional government administrative costs and inject the government more deeply into the mining process than was true in the past. The more stringently the Federal government defines MER, the less value it will receive for leases offered by a competitive bonus system since the increased cost of mining the last, more costly unit of coal lowers the economic rent to the government. Costs to consumers could tend to increase as lower grade (more costly) coal is recovered.

In addition to potential reductions in the lease bonus payments by mining companies, there are several other potential impacts that could result from strict interpretation of the MER authority. These impacts include:

- Shifts from Federal coal to non-Federal coal.
- Increased levels of severance tax revenues.
- Possible reductions in acreage disturbed.

There is the possibility that the rigorous application of the first two MER subalternatives would diminish the competitiveness of Federal coal leases as compared to non-Federal lands. To the extent that is true, it would reduce production from Federal lands, and cause production shifts to state and private lands.

Any shifts from Federal coal lands to non-Federal coal lands would result in decreased bonus payments to the Federal Government. As production commences, however, there will be increased levels of severance tax revenues to the state governments.

Acreage disturbed by mining may be reduced through a strict interpretation of the MER authority. This could occur as a result of surface mining and subsequent deep mining of specific tracts. In this fashion previously foregone coal resources would be extracted and less land would be disturbed per tonnage mined.

The first two MER subalternatives might also prevent certain lands from being developed for gasification or other in-situ processes if these methods were not the method that achieved the maximum economic recovery of the coal resource. This would both reduce the potential supply of natural gas and change the environmental impacts of the mine site, from those associated with a

gasification plant to those associated with other forms of coal development.

Finally, these subalternatives may cause conflicts with other laws. For a particular coal deposit one portion may be amenable to being economically mined both underground mining methods and the other portion by surface mining methods; the application of MER would require the mine plan to show the recovery of both of these economically viable reserves. Over the course of a long-term coal management program, some of these joint mining tracts may present situations where only one type of mining is desirable. This could arise from a variety of situations including failure to obtain surface owner consent, land suitability determinations, hydrologic concerns, and other problems. If no discretion were available to exclude undesirable seams, mining of the entire property might not take place. Although it could be argued that new legislation is needed, the Department believes that MER does not apply to coal which cannot be lawfully mined and, in addition, that the Department retains the authority to do separate seam leasing, i.e., issue a lease which would grant the right to mine only specified coal seams. This latter authority, implicit in section 714 of the Surface Mining Control and Reclamation Act, has been used in several short-term leasing situations since Congress passed the Federal Coal Leasing Amendments Act.

5.4.8 Unsuitability Criteria

Until very recently, the Department issued coal leases for lands without specified standards for excluding lands from leasing. Local BLM managers had little incentive to seek out the best coal lands, or even to avoid the worst lands, and the tendency was to lease lands without careful pre-lease consideration of environmental impacts. In the past 10 to 15 years, and particularly in the last three years, new laws affecting coal development have been enacted including those which prohibit or greatly limit coal leasing or development on some Federal lands.

The Department is now required to take steps to ensure that unsuitable lands are not mined. Section 523 of the Surface Mining Control and Reclamation Act, 30 U.S.C 1273, requires the Secretary to establish a Federal Lands Program to govern surface and underground coal mining operations on Federal lands. One duty under that program is to carry out the Federal lands review required by Section 522 of SMCRA. Section 522 of SMCRA requires the Department to conduct a Federal lands review to assess if certain classes of Federal lands are unsuitable for all or certain types of coal mining operations, and to establish a process by which the public may petition to have Federal lands designated unsuitable for all or certain types of coal mining operations. The Department may continue to lease coal even in those lands where no Federal lands review has been done.

In November 1977, a task force composed of representatives from seven agencies and offices in the Department of the Interior (the Bureau of Land Management, the U.S. Geological Survey, the Office of Surface Mining, the Fish and Wildlife Service, the Bureau of Indian Affairs, Office of Economic Analysis, and the Office of the Assistant Secretary - Land and Water Resources) and the Forest Service from the Department of Agriculture began to formulate draft criteria to designate lands unsuitable for coal mining. The task force originally considered 44 criteria, but deleted or combined 21 of them. In late May and early June of 1978, teams drawn from the task force field tested the remaining draft criteria in four areas in the West. The task force's final report of the field tests was filed on September 11, 1978 [111].

The criteria drafted by the task force incorporated the requirements of many laws affecting coal not just those mandated by SMCRA.

The term "unsuitability" has statutory significance only with respect to standards arising under Section 522(a) of the Surface Mining Control and Reclamation Act (SMCRA). The legal basis for the unsuitability criteria which will be described below is not uniform. Three different classes of sources of authority are involved, and each authority has different implications.

Section 522(a) of SMCRA. This section requires mandatory designation of lands as unsuitable for surface mining if reclamation is not technologically and economically feasible and allows discretionary designation of lands as unsuitable for surface mining if operations will:

- Be incompatible with land-use plans;
- Cause significant damage to important historic, cultural, scientific, and esthetic values and natural systems in fragile or historic lands;

- Cause a substantial loss or reduction of long-range productivity of water supply or food or fiber products in renewable resource lands, including aquifers and aquifer recharge areas; or
- Substantially endanger life and property on natural hazard lands, including areas subject to frequent flooding and areas of unstable geology. Section 522(a) does not apply to:
- Lands on which surface mining was being conducted on August 3, 1977.
- Lands for which substantial legal and financial commitments were made prior to January 4, 1977.

Section 522(e) of SMCRA. This section prohibits surface coal mining:

- In units in various named Federal land systems such as the National Park System;
- That will adversely affect any publicly-owned park or places in the National Register of Historic Sites;
- Within 100 feet of the right-of-way line of a public road; and
- Within 300 feet of an occupied dwelling or public building, school, church, community, or institutional building, public park, or within 100 feet of a cemetery.

Section 522 (e) does not affect:

- Operations that existed on August 3, 1977; or
- "Valid existing rights".

Statutes other than SMCRA (including the Endangered Species Act, the Federal Land Policy and Management Act, the Wilderness Act, the Bald Eagle Protection Act) also require or authorize certain resource protection. Their application through the unsuitability criteria is discretionary on the part of the Secretary. Each statute must be examined to determine how it applies to existing leases.

Although the Federal Lands Program (including the Federal lands review) is exempt from the requirements of the National Environmental Policy Act (NEPA) for preparation of an environmental impact statement, 30 U.S.C. § 1292(d), the Department has decided to include in this statement an analysis of the environmental impacts of the unsuitability criteria to give the public and the Department a better opportunity to evaluate these criteria before they are finally adopted.

Field tests of the proposed unsuitability criteria were held in late May and early June 1978 in four western coal areas to determine what impact on areas with potential for coal leasing would result from application of the unsuitability criteria. The criteria tested in June 1978 are, in some instances more stringent than the criteria selected for the preferred program (see Table 3-1). The following section describes the four test areas and the specific criteria utilized in the evaluation of areas unsuitable for coal mining.

The four units involved were the Wattis Planning Unit in Utah, the Decker-Birney Planning Unit in Montana, and the Campbell and Converse Planning Units both in Wyoming. The Wattis Plannning Unit covers about 439 thousand acres and lies on the eastern flank on the Wahsatch Plateau in Carbon and Emery Counties, Utah. Approximately 250 thousand acres of coal lands were examined in the field test. The Campbell and Converse Planning Units are in northeastern Wyoming, encompassing about 2.3 million acres in Campbell County and 1.4 million acres in that part of Converse County north of the North Platte River. The effects of the unsuitability criteria were examined on about 500 thousand acres of coal lands, estimated to contain 67 billion tons of Federal coal resources. The Decker-Birney Planning Unit lies in Rosebud and Big Horn Counties in southeastern Montana, just north of the Wyoming border. The area covers about 900 thousand acres of which slightly more than 250 thousand acres of coal lands were examined in field testing of the criteria. The Federal coal lands in the area examined are estimated to contain about 13 billion tons of Federal coal resources.

The Decker-Birney and Campbell-Converse Planning Units lie in the Powder River Coal Region. The Wattis area is in the Uinta-Southwestern Utah Coal Region.

The various criteria and, in some instances, alternative criteria which were the subject of the field tests are set forth in Table 5-90. This Table is also found in the September 11, 1978, final report of the Task Force.

Table 5-91 indicates the tonnage of federal coal, acres of Federal coal lands, and percentages of both affected by application of the draft criteria to the field test areas. Based on overlay mapping of the areas affected by the several criteria, their cumulative application in the Decker-Birney Plan-

TABLE 5-90

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED INFORMATION PROCESS
CRITERION 1-LEASING EXCLUSIONS (1) All Federal lands included in or candidates for inclusion in the following land systems or categories are not available for coal leasing: National System of Trails, National Wilderness Preservation System, Wild and Scenic Rivers System, National Recreation Areas,Custer National Forest (exclude surface mining only) and Federal lands in incorporated cities, towns, and villages.	A lease may be issued for underground coal mining within the Custer National Forest with the consent of the Department of Agriculture.	1. SMCRA, Sec. 522(e) P.L. 95-87 2. Section 16 of P.L. 94-377	Maps of existing Federal lands within the various land systems. Maps of potential additions to these systems from appropriate agencies. BLM Laster Title Plats.
CRITERION 2-RIGHTS-OF-WAY AND EASEMENTS (2) Federal lands that are within rights-of-way or easements for residential, commercial, industrial, public purposes and agricultural crop orudction shall be excluded from coal leasing. Whenever possible, Federal leases should exclude areas identified in section 522(e) of SMCRA (lands within 100' outside of ROW of public highway or within 100' of cemetery, and within 300' of occupied building, school, church, community or institutional building or public park or within 300' of an occupied dwelling unless waived by the owner thereof.)	A lease may include such areas if: (a) it is determined that coal development (e.g. underground mining) will not interfere with the purpose of the right-of-way or easement, or (b) the ROW or easement was granted for mining purposes, or (c) the ROW or easement was issued for a purpose for which it is not being used, or (d) where the parties involved agree to leasing or (e) if it is impractical to exclude such areas due to location of coal and method of mining and such areas can be protected through use of appropriate stipulations.	1. Departmental Policy 2. Section 522(e) of P.L. 95-87 SMCRA	This determination would be made on a case-by-case basis using available plat data, country road maps, etc.
CRITERION 3-ROADLESS AREAS - ALTERNATIVE 1 (3)(a) Federal lands designated as roadless or under review as candidate roadless areas are unsuitable for surface mining and shall be excluded from coal leasing until the Congress determines which portions of the roadless lands will be included within the Wilderness System.	No exceptions except valid existing rights will be honored. Where valid coal PRLAs are within roadless or wilderness study areas, no leases will be granted until wilderness review is completed. For valid PRLAs option of exchange should be considered.	1. P.L. 88-577 (1964 Wilderness Act) 6USC 1133 2. FLPMA, 43USC 1702 and 1782 3. Forest Service Rare II in Nov. 19, 1977 F.R.	Maps showing roadless, wilderness study and wilderness areas from BLM, FWS, NFS, and Park Service.
CRITERION 3 - ALTERNATIVE 2 (3)(b) BLM administered lands designated as roadless and under review for wilderness values will be excluded from coal leasing until such time as the wilderness study areas have been identified. At that time lands within the roadless areas but outside the wilderness study areas may be considered for coal leasing. The areas remaining within the wilderness study areas will be excluded from competitive coal leasing until the Congress determines which portions of such lands will be included within the Wilderness System. At that time lands outside of the designated wilderness areas may be considered for leasing on a case-by-case basis with a suitable buffer zone around the designated wilderness areas. Forest Service administered lands designated as roadless and under review for wilderness values will be excluded from coal leasing until such time as the Congress determines which portions of such lands will be included within the Wilderness System.			

TABLE 5-90 (Continued)

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED OR INFORMATION PROCESS
CRITERION 3 - ALTERNATIVE 3 (3)(c) BLM administered lands designated as roadless are unsuitable for mining and shall be excluded from coal leasing.			
CRITERION 4-SCENIC AREAS - ALTERNATIVE 1 (4)(a) Scenic Federal lands designated by visual resource management analysis as Class I or II (areas of outstanding scenic quality and/or high visual sensitivity) but not currently on the National Register of Natural Landmarks, shall be excluded from coal leasing.	An exception may be granted if it can be determined that coal mining will not diminish or adversely affect the scenic quality of the designated area.	P.L. 94-579, sections 201 and 202. Departmental Policy	Class I or II according to BLM classification system. The criterion should also apply to comparable rankings of scenic values by other land managing agencies: e.g., FS.
CRITERION 4 - ALTERNATIVE 2 (4)(b) Scenic Federal lands designated by visual resource management analysis as Class I (areas of outstanding scenic quality) but not currently on the National Register of Natural Landmarks, shall be excluded from coal leasing.	Same as 4a.	Same as 4a.	
CRITERION 5-LANDS USED FOR SCIENTIFIC STUDIES (5) Federal lands being used for scientific studies involving food and fiber production,natural resources, or technology demonstrations and experiments are unsuitable for mining and shall be excluded from coal leasing.	A coal lease may be issued: (1) with the concurrence of the principal scientific user or agency, or (2) where the mining could be done in such a way as to not jeopardize the purpose of the study.	1. Departmental Policy 2. SMCRA 3. FLPMA	Information on such agreements and the location of such sites are maintained by the surface managing agencies.
CRITERION 6-STATE UNSUITABLE LANDS - ALTERNATIVE 1 (6)(a) Under the provisions of Section 522 of the SMCRA where States have designated non-Federal lands to be unsuitable for surface mining and such non-Federal lands are contiguous to or cornering on Federal lands, a buffer zone of Federal lands of (1) mile from the boundary of the designated non-Federal lands shall be unsuitable for surface coal mining and unavailable for Federal leasing. In no case should the area of the buffer zone exceed the area of the State lands designated as unsuitable. CRITERION 6 - ALTERNATIVE 2 (6)(b) Eliminate this criteria and direct Departmental land managing agencies to determine buffer zones around State designated unsuitable lands on a case-by-case basis.	1. Any exceptions applicable to the State lands should also be applied to this Federal buffer zone. 2. Federal land management agencies may modify or eliminate buffer zones as necessary to maintain consistency with the purpose of the State designation or States may petition for changes in buffer zones. States must concur with changes in Federal buffer zone. 3. Leasing may be allowed within the buffer zones if the coal would be mined by underground mining methods and would not affect the State designated lands.	1. P.L. 95-87, Sec. 522 SMCRA 2. Departmental Policy	Assume existing State recreation and preservation areas will be designated unsuitable by States. Also municipal water supply sources and habitat identified by the State as critical to State designated species.
CRITERION 7-HISTORIC LANDS AND SITES - ALTERNATIVE 1 (7)(a) Sites on Federal lands which are on or eligible for the National Registry of Historic Places (historic, archeological, architectural, and cultural) and an appropriate buffer zone around the outside boundary of the property are unsuitable for coal mining and shall be excluded from leasing when such areas or places are of national significance.	Leasing may be allowed where: 1. Areas or sites are of regional or local significance and with the concurrence of the State government.	1. National Historic Preservation Act of 1966, (16 U.S.C. 470 et. seq.)	Listing of the National Registry of Historic Places from the Heritage Conservation and Recreation Service and listing of properties eligible for the Registry from appropriate State, local, and Federal agencies.

TABLE 5-90 (Continued)

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED OR INFORMATION PROCESS
CRITERION 7 - ALTERNATIVE 2 (7)(b) Same as above except eliminate condition of "national significance" in order to be excluded from consideration for Federal coal leasing	2. The effects of coal mining can be satisfactorily mitigated through use of mining technology and the Advisory Council and State Historic Preservation Officer have consented to mining, if the site or property is on the National Registry. 3. The cultural resource areas can be studied and recovered or they contain items that can be moved or restored without any loss of significance.	2. Archaeological and Historic Preservation Act Amendments of 1976 (16 U.S.C. 470(b) et. seq.) 3. Historic Sites, Buildings and Antiquities Act of 1935 (16 U.S.C. 461-467) 4. Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469)	
CRITERION 8-NATURAL AREAS (8) Federal lands designated as natural areas or as National natural lankmarks, and Federal lands which will be on or eligible for the National Registry of Natural Areas (ecologic, geologic, scenic, and lands with wild or scenic significance) are unsuitable for surface coal mining and shall be excluded from coal leasing when such areas are of national significance.	Leasing may be allowed in these ares if: 1. Such areas or sites are of regional or local significance and with the concurrence of the State government and, where appropriate, the Heritage Conservation and Recreation Service. 2. It can be determined that the effects of mining will be mitigated through the use of appropriate mining technology and with the concurrence of HCRS. 3. The mining of the coal resource will enhance information recovery (e.g., paleontological sites).	1. Departmental Policy 2. Legislation dealing with the establishment of a National Heritage Program has been proposed which will establish a National Register of Natural Areas. 3. S.O. 3017 which establishes the Heritage Conservation and Recreation Service (HCRS).	Listing of any natural areas designated by Federal agencies. Park Service and HCRS may also have identified some natural areas.
CRITERION 9-ENDANGERED SPECIES (9)(a) Legally designated critical habitat for Federal threatened/endangered (T/E) plant and animal species are unsuitable for coal mining and shall be exlucded from coal leasing. (9)(b) Crucial value habitat for Federal T/E species as determined by the FWS and the land management agency where the presence of T/E species has been scientifically documented are areas of critical environmental concern and are excluded from coal leasing. (9)(c) High value habitats for Federal T/E species, as determined by FWS and the land management agency, shall be considered for leasing only after it is scientifically determined that the area is not a critical or crucial habitat.	Leasing may be allowed if after consultation with FWS it can be determined that the species habitat will not be adversely affected by coal development or that complete mitigation is possible.	1. Endangered Species Act of 1975, (30 U.S.C. 181, et. seq.) 2. Departmental Policy 3. Authority for ACEC in FLPMA, (43 U.S.C. 1702).	Maps of critical habitat for endangered and threatened species from land management agencies and FWS. Maps showing suspected (documented) T/E species presence. Information on high value habitat from wildlife inventories and land management planning documents. For brief definitions of critical, crucial, and high value habitats see page 37 of March 1, 1978 draft criteria of Coal Task Force 2.

TABLE 5-90 (Continued)

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED OR INFORMATION PROCESS
CRITERION 10-STATE LISTED ENDANGERED SPECIES			
(10) Habitats deemed critical or crucial for State listed endangered or threatened plant and animal species as determined by the land management agency in coordination with the States and the FWS are unsuitable for mining and shall be excluded from coal leasing.	1. Leasing may be allowed if after consultation with the State, it can be determined that species habitat will not be adversely affected by the coal development or that complete mitigation is possible.	1. FLPMA (94-579) 2. Sikes Act Sec. 204	Information on State species from appropriate State agency and the FWS.
CRITERION 11-BALD AND GOLDEN EAGLE NESTS			
(11) Bald and Golden Eagle nests that are determined to be active and a buffer zone of land included in a ¼ mile radius from the nest are areas which shall be excluded from coal leasing.	A lease may be issued if: 1. Mining can be conducted in such a way and during periods of time that eagles will not be disturbed during breeding season. 2. A permit or special approval is granted by the FWS to allow the eagle nest to be moved. (Permit regulations are currently undergoing review by FWS.)	1. Bald Eagle Protection Act (16 U.S.C. 668), includes all eagles. 2. Endangered Species Act of 1973 (16 U.S.C. 1531). (Bald eagles are listed as endangered species in all States except 3 where they are listed as threatened.)	Location of active eagle nests. Use definition of active provided on page 39 of March 1 draft criteria. Additional information on inventoried active eagle nests available from the FWS and land management agencies.
CRITERION 12-EAGLE ROOST AND CONCENTRATION AREAS			
(12) Bald and Golden Eagle roost and concentration areas used during migration and wintering are areas of critical environmental concern and shall be excluded from coal leasing. Where such areas have been designated as critical or crucial habitat for Bald Eagles, coal leasing shall be excluded.	A lease may be issued: 1. If mining can be conducted in such a way and during periods of time that eagles will not be adversely disturbed or 2. For Bald Eagles where such areas are designated as critical or crucial habitat if the exception under endangered species criteria are met.	1. Bald Eagle Protection Act (16 U.S.C. 668). 2. Endangered Species Act of 1973 (16 U.S.C. 1531). 3. Authority for ACEC in FLPMA (43 U.S.C. 1702).	Use existing inventory data of roost and concentration areas from BLM FWS, and FS. Definitions of "roosting and concentration" areas from page 40 of March 1 draft criteria.
CRITERION 13-RAPTOR CLIFF NESTING SITES			
(13) Federal lands containing raptor cliff nesting sites with active nests and a buffer zone of Federal lands ¼ mile radius from the next site are areas which shall be excluded from competitive leasing.	A lease may be issued: 1. Where it can be determined that coal mining will not adversely impact the nesting sites during the breeding season. 2. Where nest sites may be moved with concurrence of the FWS.	1. Migratory Bird Treaty Act. 2. Departmental Policy.	Use existing inventory data and any additional inventory data from the FWS. Definitions of active nests from page of March 1 draft criteria.
CRITERION 14-MIGRATORY BIRDS			
(14) Federal lands which are habitat for migratory bird species of high Federal interest (as determined by the FWS) that are determined to be critical or high priority habitat by the land management agency in consultation with FWS are areas of critical environmental concern and shall be excluded from coal leasing.	A lease may be issued: 1. Where it is determined by the land management agency in consultation with FWS that coal mining will not adversely impact the migratory bird habitat during periods when such habitat is used by the species. 2. Where the land management agency in consultation with the FWS determines that the impact on the habitat can be mitigated through use of appropriate mining and reclamation technology and lease stipulations.	1. Migratory Bird Treaty Act. 2. Fish and Wildlife Act. 3. Departmental Policy.	For definition of criteria and high priority habitat values see page 44 of March 1 Task Force draft.

TABLE 5-90 (Continued)

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED OR INFORMATION PROCESS
CRITERION 15-CRUCIAL HABITAT FOR HIGH INTEREST FISH AND WILDLIFE SPECIES - ALTERNATIVE 1 (15)(a) Federal lands that have critical or high priority fish and wildlife values for species of high State or Federal interest are areas of critical environmental concern and shall be excluded from leasing. CRITERION 15 - ALTERNATIVE 2 (15)(b) No specific a priori criteria for this topic; areas containing high fish and wildlife values protected on a case-by-case basis based on resource values and mitigation potential.	A lease may be leased where: 1. It can be determined that the coal mining impacts on the habitat will not adversely affect the species during critical periods for breeding, migrating, feeding, or wintering. 2. It can be determined that the impacts of coal mining can be mitigated through use of appropriate mining and reclamation technology.	1. Fish and Wildlife Coordination Act (16 U.S.C. 661-667(e)), (particularly where leasing could result in diversion or modification of streams or other bodies of water). 2. Wild Freeroaming Horses and Burros Act (16 U.S.C. 1331-1340) (where leasing would impact such habitat.) 3. Anadromous Fish Conservation Act (16 U.S.C. 757(a)-757(b). 4. Departmental Policy.	Various inventories of fish and wildlife habitats from BLM, States, FWS, etc. For definitions of "critical and high priority" fish and wildlife values see page 44 of March 1 draft task force criteria.
CRITERION 16-WETLANDS (16) Federal lands containing: (1) inland lakes, impoundments, and associated wetlands, (2) inland shallow predominantly vegetated wetlands, (3) rivering wetland systems, lower perennial and upper perennial systems with flow greater than 5 cubic feet per second and riparian zones in a "relatively undisturbed" state that are larger than 1 linear mile along a riverine system are critical environmental areas and shall be excluded from coal leasing.	A lease may be issued where: 1. The use of appropriate mining or reclamation technology will not significantly affect the wetlands or will provide for complete restoration and mitigation. 2. Where the wetlands contain no significant values for ground-water recharge, fish and wildlife habitat, recreation or scientific study.	1. E.O. 11990, May 1977 (Wetlands Executive Order.) 2. Fish and Wildlife Coordination Act (16 U.S.C.A. 661). 3. Departmental Policy.	Use wetland inventory data from land management agencies, FWS and SCS.
CRITERION 17-RARE VEGETATIVE SPECIES AND COMMUNITIES (17) Federal lands that contain rare plant species, species with unusual vegetative form, rare climate and native communities, or relic communities as determined by the land management agencies are areas of critical environmental concern and shall be excluded from coal leasing.	Leasing may occur where: 1. Mining can be conducted in such a way as to not impact the plant species. 2. Coal development will improve the habitat for the plant species. 3. It is demonstrated that complete mitigation is possible by use of reclamation technology.	1. Departmental Policy on natural diversity.	List of rare species by ecoregions-identification of habitat types.
CRITERION 18-ALLUVIAL VALLEY FLOORS (18) To be provided by OSM Task Force.			

TABLE 5-90 (Concluded)

DRAFT UNSUITABILITY CRITERIA FIELD TESTED IN 1978

CRITERIA AND ALTERNATIVES	EXCEPTIONS	AUTHORITY	DATA NEEDED OR INFORMATION PROCESS
CRITERION 19-FLOODPLAINS - ALTERNATIVE 1 (19)(a) Riverine, coastal, and special floodplains (100-year recurrence interval) are natural hazard lands and shall be excluded from coal leasing. CRITERION 19-FLOODPLAINS - ALTERNATIVE 2 (19)(b) Same as above except 100-year recurrence interval is replaced by a 500-year interval.	Leasing may be allowed where (1) leasing a particular tract is the only practical alternative and (2) potential for harm to people or property and natural and beneficial values of floodplains can be minimized through use of demonstrated and available mining and mitigation measures.	1. Executive Order 11988, May 24, 1977, Floodplain Management. 2. Guidelines for Implementing Executive Order 11988-Water Resources Council, Feb. 10, 1978.	For description of E.O. and guidelines see paper entitled "Floodplains" attached to March 1 Task Force draft. HUD/Corps of Engineers floodplain maps.' Historical records, USGS modeling.
CRITERION 20-MUNICIPAL WATERSHEDS (20) Federal lands which have been committed to use as municipal watersheds are unsuitable for mining and should be excluded from coal leasing.	Leasing may be allowed: 1. Where it can be determined that mining will not adversely affect the watershed to any significant degree, or 2. Where the municipality or water users concur in the issuance of the lease.	1. Policy from Safe Drinking Water Act. 2. Departmental Policy.	
CRITERION 21-NATIONAL RESOURCE WATERS (21) Federal lands with National Resource Waters, as identified by States in their water quality management plans and a buffer zone of Federal lands ¼ mile from the outer edge of the far banks of the water, are unsuitable for mining and shall be excluded from coal leasing.	1. The buffer zone may be elimiated or reduced in size where it can be determined that it is not necessary to protect the National Waters.	1. Water Pollution Control Act. 2. Departmental Policy.	
CRITERION 22-PRIVATE SURFACE-FEDERAL COAL (22) Federally owned coal resources that are overlain by non-Federal surface ownership should be excluded from future coal leasing.	A lease may be issued in such areas where: 1. The surface was owned in fee by a coal company on August 3, 1977 (date of SMCRA). A company which has a lease for the surface or some other arrangement other than fee ownership does not qualify as a surface owner. Coal Company is defined as any corporation, partnership, association, or company which has mined or is mining coal resources.	1. Departmental Policy.	

TABLE 5-91

SUMMARY OF RESULTS OF 1978 FIELD TEST
OF DRAFT UNSUITABILITY CRITERIA

CRITERIA	FEDERAL COAL ACRES AFFECTED						FEDERAL COAL RESERVES AFFECTED					
	ACRES			PERCENT			TONS (million)			PERCENT		
	WYOMING	MONTANA	UTAH	WYOMING	MONTANA	UTAH	WYOMING	MONTANA	UTAH	WYOMING	MONTANA	UTAH
1. Leasing Exclusions	360	33,485	1,800	0.08	11.8	0.36	45	1,486.4	14	0.1	10.3	0.4
2. Rights-of-Way	1,965	22,518	27,000	0.45	9.0	5.44	248	1,105.1	203	0.7	8.5	5.4
3. Roadless Areas	980	5,960	325,000	0.2	2.4	65.52	120	211	4,890	- -	1.6	- -
4. Scenic Areas (Class I and II)	0	9,558	30,200	0.0	3.8	6.09	0	704.7	227	0.0	5.4	6.1
5. Scientific Study Lands	970	0	6,100	0.02	0.0	1.23	120	0	46	0.2	0.0	1.2
6. State Unsuitable Lands	No states have yet identified areas.						No states have yet identified areas.					
7. Historic Lands of National Significance	460	3,456	3,000	0.04	1.4	0.61	60	314.3	23	0.1	2.4	0.62
8. Natural Areas	0	3,420	3,700	0.0	1.4	0.75	0	101.8	28	0.0	0.8	0.75
9. Endangered Species	5,130	880	144,000	1.41	0.3	29.03	642	23.2	1,100	1.0	0.2	29.7
10. State Endangered Species	0	0	144,000	0.0	0.0	29.03	0	0	1,100	0.0	0.0	29.7
11. Bald and Golden Eagle Nests	0	1,265	0	0.0	0.5	0.0	0	58.9	0	0.0	0.5	0.0
12. Eagle Roost Concentration Areas	0	0	10,400	0.0	0.0	2.1	0	0	78	0.0	0.0	2.1
13. Raptor Cliff Nesting Sites	1,890	3,754	0	0.5	1.5	0.0	237	203.8	0	0.4	1.6	0.0
14. Migratory Birds	0	310	2,100	0.0	0.1	0.42	0	12.3	15	0.0	<1.0	<1.0
15. Resident Fish and Wildlife	185,200	244,072	322,000	55.7	97.6	64.92	23,435	12,755.8	2,400	34.9	98.2	64.8
16. Wetlands	0	1.7	0	0.0	0.07	0.0	0	210	0	0.0	0.08	0.0
17. Rare Vegetative Communities	0	0	28	0.0	0.0	0.8	0	0	3,700	0.0	0.0	0.75
18. Alluvial Valley Floors	3,700	0	0	4.6	0.0	0.0	27,500*	0	0	5.0	0.0	0.0
19. Floodplains	2,550	432.6	35	3.8	3.7	0.9	21,400	8,569	4,600	8.0	3.4	0.93
20. Municipal Watersheds	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
21. National Resource Waters	0	0	0	0.0	0.0	0.0	0	0	0	0.0	0.0	0.0
22. Private Surface/Federal Coal	55,000	11,676	N.R.	82.0	89.9	N.R.	116,000	222,147	N.R.	78.5	88.8	N.R.

*Maximum of a range that varied depending on AVF definition.

ning Unit excluded about 4.1 billion tons of coal or about one-third of the Federal coal resource. The draft criteria excluded 341,000 acres; 72 percent was caused by draft criteria 15. In the Campbell-Converse Planning Unit, slightly less than half of the Federal coal resource (32 billion tons or 256,000 acres) was pre-empted by application of the criteria. In both areas the single criterion which excluded the most coal was criterion 15, fish and wildlife habitat of high state interest.

Insufficient data limited the testing of four criteria (state unsuitable lands, state-listed endangered species, national resource waters, and migratory bird habitat) in both the Wyoming and Montana test areas. Additionally, data were lacking for alluvial valley floors in the Decker-Birney test area and for eagle nest sites and eagle concentration areas in the Campbell-Converse test area. If data were available for these criteria, additional Federal coal lands would likely be excluded from further consideration for coal leasing in both areas.

The field test of the criteria in the Utah area showed little affect on Federal coal availability because the vast majority of the coal in the area is accessable only by underground methods and the criteria are principally oriented to the exclusion of surface mineable coal.

These field tests examined the draft criteria in Table 5-90. As a result of these tests, the Task Force recommended deletion of three draft criteria (private surface Federal coal, alluvial valley floors, and state lands unsuitable), and modifications in virtually all other draft criteria. The Under Secretary made additional alterations in the Task Force's proposals, deleted another criterion, and added five new criteria when, on October 3 and November 2, 1978, he expressed a preference for the 24 unsuitability criteria for the preferred program (see Table 3-3 and the proposed regulations in Appendix A).

As an example of the manner in which changes were made consider the preferred program criteria 15 (State Resident Fish and Wildlife) and 9 (Federally-Listed Endangered Species).

The draft version of criterion 15 first field-tested in the summer of 1978 specified that, ". . . lands that have critical fish and wildlife values for species of high state and federal interest . . . " were to be set aside from coal leasing. In making this determination the field test teams relied on a series of wildlife habitat atlases prepared for the U.S. Fish and Wildlife Service by the various state game and fish agencies or by contractors working with state data. These field tests showed that criterion 15 was excluding up to 90 percent of potential coal land. In part, this was because some portions of deer and antelope winter ranges cover most of the coal-bearing areas. The unsuitability criteria are meant to narrow down to the most critical areas the land that must be set aside from potential coal mining to preserve the resource values they cover. The earlier form of criterion 15 was not doing this.

As a result of these tests, Criterion 15 was rewritten and retested with a new, narrower wording: ". . . lands which the land management agency and the State jointly agree are fish and wildlife habitat and which are essential for maintaining these priority wildlife species . . . "

The revised wording signals the local land manager and the States that only the habitat *most critical* to the existence of a viable population of high interest species in an area (e.g., *most critical* deer and antelope winter range) should be found unsuitable.

The draft version of criterion 9 also field tested in the summer of 1978, specified three levels of threatened or endangered species habitat protection: (a) legally designated; (b) crucial (where the presence of threatened or endangered species had been scientifically documented); and (c) high value (where there was a presumption of presence unless proven otherwise). In applying this three-level criterion, the Wattis, Utah team removed an unusually large area of land from consideration because of the assumed relationship between prairie dog towns and black-footed ferrets. As a result of this test, the Department's Unsuitability Task Force, in redrafting criterion 9 for its final recommendations, dropped the third level of endangered species habitat protection from the criterion. When the habitat is not legally designated as critical habitat, the application of the criterion requires *two* determinations. First, the determination that the presence of the species is scientifically documented (e.g. actual sighting or identification of tracks, scat, etc. by a knowledgable observer in recent years). The second determination, which must be made, is that the habitat is essential to the maintenance of the species.

Thus, while the local land manager would certainly be careful in making determinations in

areas of prairie dog towns and would consult with anyone likely to have documentation of the black-footed ferret's presence, he would not rule prairie dog towns unsuitable *a priori.* He would have to apply the two part test of scientific documentation and essential habitat.

The five criteria added by the Under Secretary to those recommendations by the Task Force were the reclaimability, alluvial valley floors, prime farm lands, state lands unsuitable, and state-proposed criteria. The Secretary deleted the Task Force-proposed rare vegetation criterion.

The 24 criteria selected for the preferred program are presently being applied on an interim basis in certain land use plan areas in accordance with the procedures, and for the purposes, set out in 43 Federal Register 57662-57670 (December 8, 1978).

Any land-use plans which are affected by this round of field tests will be changed to conform to the Department's final criteria.

5.4.9 Role of Industry Nominations

Until the early to middle 1960's, the Department did not coordinate the issuance of coal leases on public lands with any sort of a planning system. Starting in the 1960's, the Bureau of Land Management began to bring its lands under the control of plans that identified land-use capabilities and demands. In 1976, Congress expressly required that land-use planning be done for all BLM-managed lands. Under the Federal Coal Leasing Amendments Act of 1976, planning is specifically required for coal and the Department may not issue a lease unless the mining is compatible with a plan (or the equivalent of a plan for certain lands where the Federal government has only minor interests).

One key question has been to decide the proper role for industry nominations in a land-use planning oriented leasing system. This involves considerations of how nominations affect the amount and location of coal to be offered for lease.

Three major sub-alternatives exist. First, the planning system would evaluate the coal resource and any environmental impacts after individual firms express their need for new coal leases. These expressions could either be by application or nomination. The land-use planners would examine these expressions in light of the plan and would decide whether mining would be "compatible" with other uses. Lands not identified by industry would not be considered for leasing. This alternative could be used both as part of systems where industry also controls the overall leasing rate and those where it does not. The EMARS II program followed this pattern and both the rate and location of leases was dependent on industry nominations.

The second sub-alternative is to have a formal industry role after the government has identified through land use planning what areas are unsuitable for mining and what areas are acceptable for further considerations for leasing. Prior to the formal role, industry, like other potential users of the public lands, would be encouraged to participate in the planning process. This is the sub-alternative used in the preferred program, coupled with a policy of government control of the overall leasing rate.

The third sub-alternative is to have no formal industry role until the time a lease sale is held. Under this approach government planners would have the responsibility to determine both rates and location of leasing.

The only practical experience with these subalternatives is that gained under the EMARS II program.

Under EMARS II, industry nominated land it wanted the Department to offer for leasing. Persons opposed to leasing nominated tracts where leasing should not take place. Nominators were requested to rank their tracts in order of preference. Nominated lands were to be reviewed for environmental considerations and lands without significant problems would normally be offered for leasing, and leased if the high bid equaled or exceeded fair market value. "Highly ranked" tracts (those nominated by more than one company or tracts highly ranked by a company) were to be offered first. Diligent development and advance royalty provisions were intended to limit speculative holdings of leases.

As part of EMARS II, the Department issued a formal request for nominations on June 1, 1976. The nominations process was boycotted by a large number of western environmental groups. The results of those who did nominate can be summarized as follows:

Nominations in favor of leasing were received from approximately 300 sources, including coal

companies, and from private citizens, many of whom own land over Federal coal deposits.

These nominators identified about 1,000 separate areas covering more than three million acres they would like to see offered in the event of a Federal coal lease sale. Some 75 nominations of 200 tracts covering more than three million acres were registered against leasing. By state, the results of the nominations were:

- Wyoming - 86 nominators favored coal leasing on 300 tracts totaling 578,000 acres, with four nominations registered against leasing on 44 tracts involving several million acres.
- Utah - 37 nominators favored leasing on 110 tracts comprising 292,000 acres; there were no nominations against leasing.
- Colorado - 68 nominators identified 190 tracts totaling 483,000 acres; there were no nominations against leasing.
- New Mexico - 19 nominators favored leasing on 66 tracts totaling 298,000 acres; one nominator listed one tract comprising 3,300 acres on which leasing should not be considered.
- Oklahoma - 15 nominators identified 20 tracts, totaling 44,000 acres; there were no nominations against leasing.
- Montana - 48 nominators favored leasing 187 tracts totaling 989,000 acres; 27 nominators identified 28 tracts comprising 80,000 acres as unsuitable for leasing.
- North Dakota - nine nominators favored leasing on 39 tracts totaling 428,000 acres; 39 nominators identified 39 tracts covering 16,000 acres as unsuitable for leasing.
- Alabama - 11 nominators favored leasing on 24 tracts covering 37,000 acres; one nomination, signed by 150 individuals who opposed coal leasing in the Bankhead National Forest in Northern Alabama, listed 81 tracts comprising 146,000 acres considered unsuitable for leasing.

The Department's analysis of these nominations suggests that the nominations process was less useful than might have been desired. First, significant numbers of people (both industry and other groups) did not participate because of lack of sufficient time. Second, many nominations were unsupported by data or other evidence to show why the tract should be leased. Third, some companies nominated significantly more coal than they (or perhaps the whole coal industry) could reasonably be expected to produce. For example, in at least thirteen instances a company nominated more lands than it would be allowed to hold under the acreage limitations in the Mineral Leasing Act of 1920. Others nominated lands which clearly do not contain any coal. The following limited conclusions can be drawn from the nominations:

- Competitive interest was highest in Southern Campbell County, Wyoming, where at least 10 companies nominated overlapping tracts.
- Greatest overall interest for coal was shown in Montana (where virtually all known coal areas were nominated) and in Wyoming (where nearly 600,000 acres were nominated).
- In Colorado, New Mexico, and Oklahoma, utility companies rather than coal companies, showed the highest interest.

Criticisms of EMARS II focused on two areas: (1) land-use planning followed industry nominations; and (2) the system minimized the opportunity for control over development-related social and economic problems, since the location and rate of leasing were controlled by industry. With respect to nominations against leasing, many people objected that it was unduly burdensome to force them to express their views for the entire Nation and to do so prior to seeing what lands industry was interested in developing.

The previous sections of this chapter analyze the differences in the amount of lands to be leased that might occur under a lease to meet industry indications of need alternative and other alternatives calling for greater degrees of government planning of when and where leasing will occur. Since the BLM has not completed revising existing land use plans to conform to new statutory requirements such as unsuitability criteria, it is not possible to directly compare the locational effects of these three subalternatives. The discussion which follows analyzes potential differences on a general level.

In comparison to the situation which existed in 1970, (the last year before the moratorium on Federal coal leasing), the Congress has now passed extensive laws governing coal mining and development. All coal development must comply with these laws The requirements of these laws include:

- Emissions standards for coal burning.
- Water quality standards.
- Revegetation and reclamation standards.
- Rents and royalties for Federal coal.
- Mine health and safety.
- Transportation costs.
- Land-use planning.

Since many major elements of the coal production cycle are regulated and will be constant under any Federal coal management system, the analysis of the relative impacts of these subalternatives must focus on the unregulated aspects of coal development that they might effect. With respect to location of leases, the primary elements are social and economic impacts. Current laws do not impose any obligations on a company to avoid triggering growth in an area in excess of the rate that can be absorbed by the affected communities. There is no obligation to build schools, roads, sewage facilities, or homes. A great many companies have assumed the burden of assisting communities in preparing for the new development, but it is well documented that coal development has created boom-town conditions in several towns in the West. The current pattern of leased tracts developed from a regulatory framework where industry had a free hand. Continued industry control over tract selection is likely to result in similar future effects.

The one important environmental impact of giving greater control over location of future Federal coal leases to industry is a loss of the opportunity to control social and economic costs associated with rapid growth in rural areas. The converse of this is that the impact of more government control may be to increase coal costs if it discourages development in least costly coal areas to avoid adverse social impacts. It is not certain that greater government control in tract selection will necessarily lead to higher costs. Coal companies which have tried to anticipate coal development have sought to gain competitive advantage by purchasing surface estates over Federal coal or by buying private coal adjacent to Federal coal. Their choices of properties could be based as much on a reliable supply of coal as obtaining the least cost coal. They may have also focused on areas that were easy to explore. The government may be able to find equally low-cost coal in areas which offer less opportunity for control by a single company. The degree to which this trade-off is made is impossible to quantify. It does seem very likely, on the other hand, that greater government control will reduce social impacts. The preferred program will assist in:

- Predicting future development so that planning and capital construction can precede coal development.
- Consulting with state and local officials to determine where in the state coal development can be accommodated with fewest adverse social impacts.
- Using regional tract ranking to ensure that tracts offered for lease offer the combination of least social cost and highest economic efficiency.

Greater government control over the location of coal lease tracts should lessen the environmental effects of coal development by reducing development in areas which are unable to absorb additional impacts and by encouraging properly-paced development in other areas. Table 5-92 summarizes the effects of the three subalternatives.

5.4.10 Land-use Planning Alternatives

One of the key elements of the preferred coal management program is its reliance on the land-use planning systems of the BLM and the Forest Service to identify areas acceptable for further consideration for coal leasing.

During the draft environmental impact statement comment period, major disagreements surfaced over how the Department should conduct comprehensive planning during the transition period to a fully operational, mature coal management program. Should it: (1) use existing land use plans; (2) supplement existing plans as set out in the proposed program; or (3) wait until new land use plans are prepared fully in accordance with whatever final regulations evolve from the proposed planning regulations?

BLM began land use planning in 1969. Such planning was initiated when the pressures from individual resource users began to intensify to a point where serious conflicts arose over the proper uses for specific land areas and the need to balance and coordinate user needs became apparent. Land use planning for multi-resource use (multiple-use planning) was adopted as a device to balance and coordinate use of BLM-managed lands. It was to consider both long-term and short-term resource development and conservation requirements, and

TABLE 5-92

COMPARISON OF SUBALTERNATIVES DISCUSSED IN SECTION 5.4.9

	SUBALTERNATIVE 1 (Maximum Industry Role)	SUBALTERNATIVE 2 (Preferred Program Model)	SUBALTERNATIVE 3 (Maximum Government Role)
A. Who is primarily responsible for key actions?			
1. Determination of Production Goals	Industry	Government	Government
2. Identifies areas for leasing	Industry	Government	Government
3. Identifies tracts for leasing	Industry	Industry	Government
4. Defines areas for Environmental Planning	Industry	Government	Government
B. What are the effects of choosing a subalternative?			
1. Cost of Planning and Administration	----------INCREASING----------▶		
2. Chances for Environmental Mistakes	----------DECREASING----------▶		
3. Chances for Production Shortages	----------INCREASING----------▶		
4. Consideration of socioeconomic concerns	----------INCREASING----------▶		

to incorporate statutory and Departmental policies into the decisions on allotting lands to particular users. As BLM's determination to plan for future uses of public lands increased, it began to formalize its procedures through the adoption of standardized manual provisions that set out what a land use plan should contain and how it should be developed. The resulting plans were called Management Framework Plans (MFPs). During this initial period of BLM development of its land use planning process, the BLM had no direct Congressional sanction or policy direction for such action. When the Congress passed FLPMA, it gave BLM express statutory authority to conduct land use planning and prescribed the basic requirements for a planning process.

The Congress was also sensitive to the need for a transition period until land use plans could be revised in accordance with its express directions; it provided that passage of FLPMA was not to grind the management of public lands to a halt while a new planning process was being established and implemented. The Congress intended, and the Department has consistently interpreted FLPMA to allow, BLM to use plans prepared before FLPMA, or prepared after FLPMA without the benefit of formally-adopted regulations, to make decisions for all activities which ultimately look to a land-use plan for guidance. The House Committee Report on FLPMA says, "The Committee is well acquainted with both the land use planning systems of The Bureau of Land Management and The Forest Service and has found them to be consistent in general principles and practices with the objectives of [FLPMA]" H.R. Rep. No. 94-1163, 94th Cong., 2nd sess. 5(1976). The Department has also, where required and appropriate, revised or supplemented old plans in response to a specific need to analyze a particular resource use. The Department has prepared supplements with respect to timber, grazing, wilderness, and wildlife management, as well as coal. The Department views any of the three subalternative that are set out in this subsection as being legally adequate. (Note: Although the Forest Service began planning much earlier as a result of greater pressure on its lands and with the advantage of the Organic Administration Act of 1897 and the Multiple Use-Sustained Yield Act of 1960, enacted 16 years before the enactment of FLPMA (BLM's Organic Act) the issues remain the same. The National Forest Management Act, enacted in 1976 (the same year as FLPMA), also provides new planning directions to the Forest Service similar to those provided to the BLM by FLPMA. The National Forest Management Act also comtemplated the use of existing Forest Service land use plans for resource decisionmaking until new plans could eventually be developed under new planning regulations. The Forest Service, as the BLM, does in fact continue to make resource decisions on existing land use plans.)

As of 1979, over 80 percent of all BLM-managed lands were covered by a Management Framework Plan. The areas recommended for coal development in these plans, plus some adjacent high value coal lands, are now being reviewed as part of an extensive field test of proposed unsuitability criteria. If new BLM planning regulations are adopted as scheduled (by mid-1979), new land use plans could not be put into effect in accordance with those regulations for some time. It normally takes up to four years to inventory resources and complete the plan preparation and approval process for a large (e.g., one million acre) planning area. Therefore, it is likely to be late 1984 before totally new plans in coal areas are available, and several more years before a sufficient number of such plans are available to be used as a basis for a fully operational coal management program. The rate at which coal areas are covered in new plans will depend on planning priorities and budget capabilities existing during the mid-1980s, which cannot be predicted with any degree of certainty.

Until the new regulations are adopted it is somewhat speculative to say how the new plans will differ from the old ones. New land use plans (called Resource Management Plans) will address specific program issues or problems. Current Management Framework Plans attempt to address all existing resources. The latter plans require a tremendous amount of inventory data. The requirement for inventory data in the Resource Management Plans may not be as great. It is likely, also, that there will have been more effective opportunity for public participation under the new planning regulations. Inadequate data and lack of meaningful public participation have been the principal arguments raised by commenters urging the Department to disavow the use of old plans in coal management decisionmaking. A critical difference in the new planning regulations will be the

importance of full environmental analysis of the proposed alternatives in the planning process and the filing of the environmental impact statement with the plan as the environmental impact statement (see 43 Federal Register 58764-58774 (December 15, 1978)).

Finally, before discussing the effects of the three subalternatives, it should be noted that the conclusions reached in the land use planning process concerning the potential for coal leasing are not a commitment by the Department that leasing will take place and do not end the process of evaluation under any of the coal management program alternatives. At a minimum, a potential lease area will still be evaluated as required by the National Environmental Policy Act and no mining will be allowed except as authorized by the Surface Mining Control and Reclamation Act of 1976. Under the preferred program, even more would be done, through the tract delineation, ranking, selection, and scheduling processes and the regional sale environmental statement. The benefits of each subalternative must be examined in light of its role in an overall management program, not in isolation from proceeding and subsequent activity.

One subalternative is to allow no new coal leasing and to curtail other coal management actions in any area until a land use plan has been prepared for that area in accordance with new final planning regulations. This subalternative would greatly delay the time the Department could, for any reason, first engage in any substantial amounts of leasing. Assuming that the planning regulations are adopted by mid-1979, the planning precedures will not be available until late 1979. They will be tested during 1980 and implemented in 1981. The first totally new plans prepared under these regulations might not be available until late 1984. It is likely that several more years would elapse before a significant number of new plans would be available upon which a mature leasing program could be based. Under this subalternative, delay in being able to resume leasing can be expected to be both lengthy and unpredictable.

This subalternative would have the same effect as the no new leasing management program alternative. If no new leasing is needed until after 1984, at the earliest, this sub-alternative could be adopted without any significant adverse effect.

The sub-alternative would be likely to result in better quality land use plans before leasing would resume. Improvements might include better identification of coal potential and of conflicting resource uses and more detailed evaluation of social and economic goals and issues. It might also result in fuller responsiveness to public demands because of greater opportunity for public participation through the planning process. It is impossible to predict *how much* the activity that finally takes place under this subalternative would be improved, e.g., would the plans more effectively guide subsequent decisions whether to lease coal than would occur under the proposed program resources? It must be expected that at least some overall improvement would occur, although the improvement may be small. This is particularly true in view of the proposed program's emphasis on tract ranking and regional leasing environmental statements. This subalternative is not compatible with any program management alternative, or choice of policy under any alternative, that involves new leasing before the necessary new plans can be prepared. Depending on why the Department would decide to lease before 1984, a variety of adverse effects might occur, including: coal costs could rise; competition could decline; less environmentally sound tracts already leased might be mined; certain coal users might experience shortages; and state and local economies might be depressed by lack of development and mineral revenues. Whether these adverse effects would be compensated for by the benefits from leasing on the basis of new plans depends on how severe the Nation's need for coal becomes and how much the plans improve. Changes in the economy, the oil import situation, conservation effects, and new laws may affect from year to year the merits of this approach.

The preferred subalternative is to issue land use plans to the new standards as quickly as time and personnel permit, but in the interim, to retain the capability to lease in those areas where the coal land portions of an existing land use plan have been supplemented to take into account the major environmental protection standards for coal operations that the Congress has enacted and the Secretary has adopted. These land use plan supplements, since they apply only to areas where coal is found can, generally, be completed in a fairly short time. (There is no need to apply the

new standards to lands outside of Known Recoverable Coal Resource Areas since those lands cannot be leased). In December 1978, the BLM instructed its field personnel to begin applying (and field testing) the unsuitability criteria by supplementing certain land use plans for areas where extensive coal is found and which the BLM State Offices felt might eventually provide tracts for lease sales or exchanges if the Secretary determines a need for leasing. As explained more fully in the Federal Register notice (43 Federal Register 57662-57670) setting out why and how the field test would be conducted, and the criteria applied, the application process serves three purposes: (1) to see if the Department's proposed unsuitablity criteria are well drafted, are easy to administer, and effectively identify those lands where additional resource protection is necessary; (2) to begin the Federal lands review required by Section 522 of the Surface Mining Control and Reclamation Act; and (3) to ensure that some plans are improved to provide a better basis for any new coal management program actions which are required in the near term.

One benefit from this subalternative is that, if leasing is needed, the interim supplementing of the plans would address all but the least obvious environmental problems and resource limitations. Environmental assessments in the tract ranking, selection, and scheduling permit approval processes would identify the remaining resource use conflicts and environmental problems. As compared with the subalternative of waiting for new land use plans, this subalternative has much greater flexibility to allow whatever development may be needed. It also has the advantage of beginning the Federal lands review as required by Section 522 of SMCRA in the places where it will do the most good–lands likely to be leased if the Secretary decides to resume leasing. If no new leasing is needed before new plans can be done, this subalternative would divert time and personnel away from the longer-term work.

The third subalternative is to proceed with leasing, if the Secretary decides it is needed, without doing additional planning work in the coal areas shown in existing land use plans either for new unsuitability criteria, or for new planning regulations, and to prepare new plans as time and money permit. Reliance would be put on the safeguards processes built into the activity planning and mine plan approval processes to uncover all tract problems. The principal benefit from this subalternative would be to save the government the expense of an interim supplement to, or additional planning work on, the plan and the diversion of resources from new plans. Under this subalternative, the review for lands unsuitability criteria would be postponed until after a lease had been issued; no work would have to be done on unleased land, and the cost and time saving might be significant.

The principal problem with this subalternative is that the Department (along with the lessee) may find itself in the position of spending several hundred thousand dollars or more on a tract only to find out two to three years after leasing that a major problem exists that makes its development undesirable. The risk of this happening is much greater than under both of the previous subalternatives. If no new leasing were needed, this subalternative would have no adverse effects as long as the preparation of new plans occurred as rapidly as under the previous two subalternatives.

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CHAPTER 6

MITIGATION OF MAJOR ADVERSE IMPACTS OF A FEDERAL COAL MANAGEMENT PROGRAM

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CHAPTER 6

MITIGATION OF MAJOR ADVERSE IMPACTS OF A FEDERAL COAL MANAGEMENT PROGRAM

6.1 INTRODUCTION

In this environmental impact statement, mitigation means a policy, procedure, or action intended to avoid, minimize, or help compensate for damage that could be caused by decisions made by the Department of the Interior about the management of Federal coal. Mitigation is intended to help protect individuals and communities from adverse social and economic impacts, as well as to protect the physical environment. This chapter recapitulates those aspects of any of the alternatives for a Federal coal management program, and discusses other discretionary measures, which would tend to lessen adverse environmental impacts. The impact analysis in the previous chapter (Chapter 5) includes those mitigating measures required by law or regulation.

The preferred alternative Federal coal management program described in Chapter 3 of this statement requires that, in deciding whether to lease or not to lease, and in deciding where, in what amounts, and under what circumstances leasing might take place, decisions about the management of Federal coal must assure that the environment be protected and that the interests of individuals and communities be considered. These mitigation measures are a direct consequence of decisions by the Secretary, instructions from the President, and requirements included in laws recently enacted by the Congress.

The President, by memorandum of May 24, 1977, instructed the Secretary to "manage the coal leasing program to assure that it can respond to reasonable production goals by leasing only those areas where mining is environmentally acceptable and compatible with other land uses." The President further directed that the Department "scrutinize existing Federal coal leases (and applications for preference right leases) to determine whether they show prospects for timely development in an environmentally acceptable manner, taking steps as necessary to deal with nonproducing and environmentally unsatisfactory leases and applications."

In response to these directives, the Department has set as one of its primary goals the "use of land use planning and effective enforcement of environmental laws to assure that Federal coal is produced in an environmentally acceptable manner and in a way that is responsive to local communities and private landowners affected by Federal coal development." Of equal importance is the Department's emphasis on consultation and cooperation with state governments, because only through such a cooperative effort could the Department be assured of the effectiveness of mitigation measures designed to protect against adverse social and economic impacts of Federal coal management decisions.

In developing and analyzing the preferred program and alternatives described in this statement, the Department was able to act in response to definitions of environmental acceptability and social and economic responsibility which were not available when the enjoined EMARS II leasing program was developed (see Section 1.2.4). During the development of the previous program, controversy about what constituted acceptable environmental and socioeconomic mitigation created an atmosphere of uncertainty, which prevented all parties interested in Federal coal management from making secure assumptions about the mitigation measures which might accompany Federal coal management decisions.

Enactment of the Federal Coal Leasing Amendments Act of 1976, the Federal Land Policy and Management Act of 1976, and the Surface Mining Control and Reclamation Act of 1977 established, after several years of Congressional debate, specific goals and standards for mitigation, and specific procedures to assure that the goals are achieved and the standards are met. These laws

ended the uncertainty about the legal and policy framework and provided rules for the management of Federally owned coal, the planning and management of the public lands and other Federally managed natural resources, and the regulation of the environmental effects of coal mining. As a result, the uncertainty about the environmental, social, and economic consequences of Federal coal management decisions have been minimized, and the effectiveness of mitigating measures are now more predictable.

In addition to the laws already referred to, many other laws provide standards and procedures requiring avoidance of, or recovery from, damage to the environment and disruption of local communities. Any Federal coal management program that might be adopted by the Secretary would recognize and include the responsibility for compliance with these laws. Statutory standards and procedures would be applied throughout the program; in the land use planning process; in the ranking, selection, and sale of specific tracts; and in stipulations attached to leases and mining plans.

The Department also recognizes its responsibility to use its discretion in the application of additional measures which would further minimize environmental and community disturbance. Certain of these discretionary measures, particularly the additional standards and procedures that will help give direction to the judgement exercised by the Department's resource managers in the field, are integrated into the preferred program and several of the alternatives. Any program implemented by the Secretary would require that other standards and procedures, if warranted, be identified and applied to supplement those described in this statement.

The discretionary measures for environmental impact mitigation are discussed in Section 6.2. The site-specific nature of the data required to apply these mitigating measures and assess their effectiveness significantly diminishes the opportunity to fully address such measures in this broad-based statement. The social and economic impacts of coal development and their mitigation are addressed in Section 6.3.

Throughout the discussion in the following sections, it is assumed that mitigation measures not only provide direct protection of people, communities, and resources, but also produce, as a secondary consequence, a reduction in conflict and an increase in acceptance of individual resource management decisions. Financial and administrative burdens for the government, prospective lessees, and all interests affected by leasing, will be reduced because the emphasis on early application of protective and mitigative measures will identify, resolve, or avoid conflicts. This, in turn, will provide assurance that the Federal coal development decisions which are made will be subject to less delay and uncertainty. A successful mitigation program, while aimed at minimizing environmental, social, and economic damage to individuals, communities, and natural resources, will also allow coal producers and users to make more timely and secure development plans. The producers' interest in the success of the mitigation efforts is evident and will serve to reinforce the effectiveness of mitigation elements of the Federal coal management program.

6.2 ENVIRONMENTAL MITIGATION STRUCTURE OF THE PREFERRED PROGRAM AND CERTAIN OF THE ALTERNATIVES

The preferred program and several other alternatives contain many structural environmental decision points. The key mitigation elements of the preferred program and the alternatives are described in Chapter 3, but are reviewed briefly in the following paragraphs from the viewpoint of opportunities they provide to protect environmental values.

The most important of the structural environmental features of the preferred program and several of the alternatives is the use of unsuitability criteria to identify and protect resources of major importance. The need to review Federal coal lands and make unsuitability determinations is set out in Section 522 of the Surface Mining Control and Reclamation Act of 1977. The use of criteria to establish a standard list of resource values which must be considered by the land manager is based on the preference expressed by the Secretary. The Secretary recognized the need to ensure both uniformity and consistency in the manner in which the decisions on unsuitability for coal mining are made. The application procedure accompanying the criteria ensures that each potential resource conflict will receive careful, individual consideration before the land manager decides whether to exclude an area from all or certain types of coal

mining, or whether to require mitigation measures that would allow mining. The application of these criteria, based on a comprehensive review and, where needed, on an inventory of an area's resources, would provide a threshold of protection of those resources and interests which could be affected by Federal coal development.

By incorporating unsuitability criteria procedures in the land use planning process, the Department would not abandon its basic multiple-use resource management system. Decisions which determine the best combination of uses for all the resources under the jurisdiction of the Federal resource manager would still be made after application of unsuitability criteria. Coal leasing could be prohibited, or allowed to proceed under special conditions, on lands where the land manager determines that coal mining would seriously conflict with other important resources. In situations where the land manager wants to protect a conflicting resource at or above a desirable level, he could turn to the use of threshold levels. These levels are inherenty adaptive to the actual future course of coal impacts (see Section 3.2.2.5). The key decision is the selection of alternative uses best suited to the planning area. The land use planning system, thus, inherently identifies activities which may minimize undesirable impacts and, consequently, reduces the need for additional mitigating measures.

These field level land use planning procedures present a key opportunity for recognizing needed local constraints on coal leasing. The public would have an opportunity to comment on the lands identified as acceptable for consideration for leasing, and participate in the resources trade-off decisions.

In addition to the incorporation of specific criteria as guidance for individual land use planning decisions, the preferred program includes another new and major mitigation element, which assures that mitigation is a priority element in final tract selection decisions. This process requires the ranking of those tracts which could be leased within a region so that the consequences of selecting specific tracts for development can be compared, both within a particular region and among regions.

The process recognizes that, because of the probability that, in many regions, there will be more Federal coal that could be leased than would be necessary to lease, the Department has a responsibility to select, from among those coal lands which are not excluded from leasing through application of unsuitability criteria or other resource management decisions, those tracts whose development would cause the least environmental, social, and economic damage. This means that mitigation will take place even in those areas where both the application of laws and standards and the exercise of the resource manager's judgement have led to decisions that other resource values must be subordinated to the need for the leasing and mining of Federally owned coal.

The regional tract ranking process also provides the most effective opportunity for consideration of social and economic consequences of Federal coal management. The Department, while recognizing its responsibility in this important area, also recognizes that social and economic values, problems, and mitigation measures can not be categorized, evaluated, and implemented through a process of criteria and standards in a Federal resource management program. Because the ranking process is less a reflection of law and standards, and more a reflection of judgement and discretion, it is better suited to the evaluation of local and regional social and economic considerations. These considerations are to receive priority, along with identification of environmental consequences, in the ranking process included in the preferred Federal coal management program and several other alternatives.

The impacts of developing a specific tract, and the cumulative and interdependent impacts which would result from developing groups of tracts, would be considered in selecting those tracts to be offered for sale. By ranking and comparing all tracts within a region, rather than ranking only those tracts in geographically smaller individual planning areas, and by considering how the timing of tract development could influence the amount or kind of impacts, the Department would be able to select for leasing those tracts which have the least adverse cumulative environmental, social, and economic impacts.

Other significant mitigation measures in the preferred program and several of the alternatives are set out below:

- By providing for extensive public participation and special opportunities for the states to take part in the leasing process from land

use planning through lease sale and beyond, the Department would seek to ensure that the local and regional publics and their representatives—those most knowledgeable about local and regional conditions—will always be well represented in leasing decisions. The careful consideration of the views of the states and the comments of the public before major leasing decisions are made would serve to mitigate adverse local and regional impacts of coal development.

- The procedure for setting regional production goals and leasing targets ensures that the need for coal leasing would be continually reassessed, thus avoiding the leasing of an unnecessarily large number of tracts. Too large a number of leased tracts would diminish the ability of state and local governments to plan with an adequate degree of accuracy to mitigate social and economic impacts of coal development. The leasing of an excess number of tracts also would diminish the effectiveness of the ranking process, require the selection of additional less desirable tracts, and increase local uncertainty about the potential environmental consequences of leasing.
- The manner in which requirements of the National Environmental Policy Act of 1969 would be complied with in the preferred program and several other alternatives would further serve to identify adverse impacts and the opportunities for mitigation. National and interregional impacts of Federal coal management decisions, described in this statement, would be carefully monitored by the Department and considered in supplements to this statement, if required. Environmental impact statements considering the impacts of proposed lease sales for four-year periods within specific coal regions would be prepared. These statements would examine the cumulative environmental impacts of coal development on a region-wide basis, as well as consider the site-specific impacts of each tract to be offered for lease. The public participation opportunities provided during the environmental impact statement process would provide additional extensive opportunity for the public to assist the Department in assuring that decisions at every level of a Federal coal management program would fully consider environmental impacts and mitigation measures.
- The preferred definition of maximum economic recovery (MER) seeks to encourage the aggressive removal of coal from Federal leases. Coal which is considered marginally subeconomic under current practices would, under the preferred program, likely be included in coal production from the lease. To make removal of these deposits possible without unfair economic hardships on the mine operator, the Department would give up some of the bonus bid it might otherwise require for a lease where the MER determination indicates that the trade-off is for the long-term benefit of the public, considering all environmental and social factors bearing on the tract. This approach to MER would in the long run lessen the area disturbed by mining and decrease the possibility of second mine openings over the same area.
- The Secretary has also indicated that the Department should be responsible for determining, with reasonable certainty, that a specific tract can be developed without severe or permanent harm to the environment and for determining the stipulations needed to ensure this protection prior to the lease sale, rather than waiting to make this determination at the mining plan stage. This requires that the Federal coal management program have adequate environmental data available for tract ranking and selection prior to the decision to lease. Site-specific analysis of each tract would be conducted prior to ranking and an examination would be made for each selected tract to develop lease stipulations, if necessary. Where appropriate, additional detailed, site-specific conditions would be imposed in the mining permit issued upon approval of the mining plan.
- The Secretary would require, under the preferred program and several other alternatives, that unsuitability criteria and general land use trade-off decisions be applied not only to new competitive leasing, but also to existing, nonproducing leases, emer-

gency leases, and noncompetitive leases. Appropriate action would be taken where noncompliance is found. This element of the program would help bring consistent mitigation to those lands which could be affected by development of the more than 500 outstanding leases and more than 200 preference right lease applications.

- The Department's Energy Minerals Rehabilitation Inventory and Analysis Program (EMRIA) would provide site-specific reclamation data for use at the several decision points in the preferred program and several other alternatives. EMRIA, begun in 1975, entails inventory and analysis of rehabilitation capability of lands having potential for Federal coal development. Soils, overburden, surface and ground water, as well as revegetation characteristics are analyzed so that prescriptions for reclamation can be developed.

While this discussion has given emphasis to those mitigation measures which prevent or minimize damage by prohibiting, restricting, or directing the relocation of prospective Federal coal leasing, it should be noted that most of the mitigation measures built into the preferred program and several other alternatives are designed to assure that when Federal coal leasing and resultant mining take place, both the damage and the benefits from coal development are considered and are managed in a way that will minimize environmental and social disruption.

The key measures mitigating the physical environmental consequences of coal mining are contained in the Surface Mining Control and Reclamation Act of 1977. In general, the law requires premining permit application and reclamation planning; the application of standards for the conduct of mining which relate to the environmental effects of the mine operation, on and off the mine site, as well as to public health and safety; state or Federal processes for designating lands as unsuitable for mining; and adoption of state laws and regulations for enforcement of regulatory programs which meet minimum Federal standards. The act also applies these standards and processes to the surface effects of underground mining.

These mitigation measures are described in detail in the Final Environmental Statement on the Proposed Final Regulations of the Office of Surface Mining [1].

6.3 MITIGATION OF SOCIOECONOMIC IMPACTS

Many of the most serious problems associated with coal leasing involve the ancillary social and economic effects of development. In rural areas, coal development has induced wholesale change in the social and economic structures of numerous isolated communities. While the change offers possible long-term benefits for the communities in question, short-term distress has too often been the more visible result. The mitigation of the socioeconomic impacts of coal development presents special problems for the Department, since its statutory authorities and responsibilities are far more limited than the scope of the problems. For the time being, the Department's chief response must be improved coordination and consultation with local and state governments, as provided in the preferred program and several other alternatives.

6.3.1 General Socioeconomic Impact Mitigation

Impact assistance is a policy question of independent national significance. In March 1978, an intergovernmental Energy Impact Assistance Steering Group completed a report to the President which examined the nature of adverse social and economic impacts from energy development, gaps in existing mitigation mechanisms, and a broad range of program energy impact assistance options [2]. The report's treatment of these problems is instructive for this statement and recommended generally as a reference.

According to the report, the fundamental cause of social and economic impacts is rapid economic growth. While the dimensions of growth problems in a given locale vary substantially (see Section 6.3.2), a number of problems seem to recur frequently. The location of most Federal coal is in isolated rural areas of the West. Since the location of the coal resource determines the sites of the economic activity, once a development site has been chosen, there is commonly little choice but to stimulate rapid growth in isolated rural areas, where the new activity is disproportionately large in relation to the existing economic base. There are frequently difficulties with taxation systems which do not target tax resources to impacts, which were

designed to suit an agricultural economy, or which do not coincide with the boundaries of economic activity. Much of the labor force for the Decker mine in Montana, for example, lives in Sheridan, Wyoming, even though the mine produces revenues for Montana. Finally, all of the impact problems are exacerbated by uncertainty, which weakens both individual and institutional accommodations to change.

The report found five leading categories of impacts:

- Public facility and service deficiencies or shortages.
- Commercial facility and professional services deficiencies and shortages.
- Housing shortages and housing price inflation.
- Social disruption.
- Transportation impacts.

The report focused its analysis on five specific categories of gaps in existing mitigation mechanisms:

- Information – timely and accurate information regarding the development is commonly unavailable.
- State/local/tribal participation in the decision-making process—the inability of these institutions to participate early on in decisions regarding timing, location, and scope of development.
- Planning and management – inadequate state, local, and area-wide institutional capacity.
- Coordination of assistance mechanisms – the imprecise targeting of existing Federal programs to impact problems.
- Financing – the difficulty that impacted communities have in securing access to normal financing mechanisms.

The preferred program and several alternatives would attempt to close the first two of these five gaps. The others are not within the Department's direct jurisdiction, but, through cooperation with other Federal agencies and state and local governments, the Department can help make the total effort to mitigate social and economic impacts more effective.

In addition to mitigation of social and economic problems common to all rural areas affected by sudden and large-scale industrial growth, priority is given in the Department's preferred program and several other alternatives for mitigation to protect those agricultural communities which, in the western states where Federal coal is most abundant, are dependent on sound management of grasslands, watersheds, and other resources which serve as the foundation for extensive livestock grazing and other agricultural enterprises. Mitigation of impacts on agricultural economies is not limited to management measures designed to permit livestock and crop production to continue at existing levels or expand while coal production increases. A principal element of the preferred program and several other alternatives is consideration, throughout the decision process, of measures to assure that those individuals and families who are on ranches and farms, as well as the communities and the resources which support individual agricultural enterprises, are not damaged or disrupted.

It should be emphasized that mitigation also includes measures to assure that the potential benefits of coal development are recognized, and the effect of the distribution of these benefits considered, when decisions are made about management of Federal coal. So, while the preferred program and several other alternatives would operate to protect resources and people from damage, they would also be capable of determining how the distribution of benefits would affect those same people and resources. With information made available from community leaders, tribal officials, state and local governments, and individuals, Federal coal management decisions can reinforce the community development and economic plans of citizens in those areas where Federal coal is located.

Guidance provided to the Department's resource managers and other planners by the report includes identification of nine principal factors that should be considered when evaluating the impacts of proposed decisions:

- Avoidance - the extent to which the occurrence of adverse socioeconomic impacts due to energy development can be minimized, if not averted altogether, in the early stages of the energy development process.
- Closing Policy Gaps - the degree to which the process for formulating energy development policy and making key energy facility siting decisions provides adequate opportu-

nity for participation by appropriate state, local, and tribal governments; also, the extent to which provisions exist for the preparation and early consideration of impact assessment data.

- Closing Resource Gaps - the degree to which proposed policies or program strategies reduce the inadequacies found to exist among existing Federal, state, local, and industry financial assistance mechanisms available to impacted areas.
- Barriers to Implementation - special organizational, administrative, or legislative steps which must be taken and the time required to effect proposed actions.
- Risk Sharing - the manner in which the consequences (e.g., higher costs, potential loss of sunk costs and future revenues from project failure, high interest payments, and other costs) of uncertainty characteristic of energy-related growth are borne by the participants in the energy development process – i.e., Federal, state, local, and tribal governments and industry.
- Cost Internalization - the extent to which the costs of addressing adverse impacts resulting from energy development are borne by the producing company or passed through in energy product processes to energy consumers.
- Impact on Federal, State, Local, and Tribal Budgets - the degree to which proposed policies and actions will increase or decrease the amount of Federal, state, local, and/or tribal funds required for impact assistance programs.
- Enhanced State, Local, and Tribal Capacity - the manner in which authorities, resources, and capabilities of state, local, and tribal governments for addressing the problems faced by energy-impacted communities are increased.
- Leverage on Industry Participation and Mitigation - the degree to which the role of industry as a participant in avoiding and/or ameliorating the adverse socioeconomic effects resulting from its energy development activities is increased.

The program recommendations of the report led to modifications in Senator Gary Hart's S. 1493, a broad-based inland energy impact assistance bill. This proposal did not pass in the 95th Congress.

Legislation providing a more modest impact authority for the Farmer's Home Administration did pass, as section 601 of the Powerplant and Industrial Fuels Use Act of 1978. This authority for both planning and construction assistance will be implemented by the Secretary of Agriculture, in consultation with the Secretaries of Energy and Labor. Funds, in the form of grants to the states, local governments, and tribal councils, are available under the program to support planning, land acquisition, and development. Coal companies within designated impact areas will be required to report to the Secretary of Energy on request by the state Governor on mine employment and related matters for the coming three years.

The Secretary of the Interior is a member of the interagency committee created by Section 746 of the Act. The function of the committee is to conduct a study of the socioeconomic impacts of expanded coal production and rapid energy development in general, on states, including local communities, and on the public. The committee is required to study the adequacy of housing and public recreational and cultural facilities for coal miners and their families, and the effect of any Federal and state laws or regulations on providing such housing and facilities.

The Secretary of the Interior also participates in another study required by the Act (Section 742 (c)), which is required to evaluate the economic and social impacts on coal-producing counties and states of present and prospective land ownership patterns and levels of income, property, severance, and other taxes paid by coal producers.

6.3.2 Program Socioeconomic Impact Mitigation

One effect of the preferred program and several other alternatives will be to decentralize decisions regarding social and economic impacts. Because of regional and local variations in these impact problems, an aggregate estimate of impacts is inherently misleading, since the mitigation response must take place on a decentralized basis, taking into account the unique aspects of each impact situation. The aggregate perspective is, therefore, not as important as a consideration of the range of potential problems. For this reason, this section addresses eight factors which illustrate the dimensions of impact variation and, hence, the

varying requirements for mitigation which a Federal coal management program must face.

6.3.2.1 Physical Characteristics. The physical characteristics of the impacted areas–topography, quantity and quality of available water, soil, and climate–have an important effect on the cost of both public infrastructure (water and sewer systems, streets) and private infrastructure (residential and commercial construction). For example, site preparation costs in West Virginia typically run much higher than in the West, due to the terrain. The steep slopes and narrow valleys in much of West Virginia also increase the problems of environmental hazards from siltation, slides, and flooding, and so require special mitigation measures that would not be so important in flatter country. Gillette, Wyoming, has different problems resulting from physical characteristics of its area. The sources of available potable surface and groundwater are many miles away from town, and the nearby groundwater requires extensive treatment before it can be used for municipal purposes. Either way, the cost of providing water in Gillette significantly exceeds the national average for per capita expenditures.

6.3.2.2 Economic Structure. Pre-existing economic conditions influence the path of the new economic stimulus provided by energy development. One such condition is the local labor market. If the local economy has a surplus of labor prior to the onset of development, the development will tend to absorb local workers and the change in population will be less than where no surplus exists. Research in the West has shown that the population change attributable to similar energy projects can vary by as much as 50 percent. At the same time, labor market conditions shift rapidly. For example, many of the high unemployment conditions that existed in southern West Virginia no longer prevail, and there are thousands of new jobs to be created in the near future. Finally, since the unemployment rate is no indicator of the availability of specialized labor, a thorough knowledge of an incoming industry's requirements may be necessary to accurately predict local population growth.

A second significant pre-existing condition is the pattern of population and service centers. Isolated communities are more likely to feel the effects of impacts than communities with services available nearby.

Finally, the nature and extent of local impacts will be affected by conditions in other local base industries. For example, the mid-1970s boom of Rock Springs, Wyoming, was caused by a combination of energy and nonenergy projects increasing their employment at the same time. Oil and gas development and increased uranium mining will cause similar additional boom pressures on several western coal regions in the 1980s.

6.3.2.3 Legal Framework. The legal framework within which local governments operate also affects the role that they can play in solving impact problems. Local governments are the legal entities of the states in which they are located, and the powers given them to raise and spend revenue, as well as to regulate land use and other matters, vary significantly from one state to another. Similarly, the state resources available to solve impact problems differ significantly from one state to another. Most western states now have some form of state funding available for impacts.

6.3.2.4 The Project. Different types of projects produce significantly different sorts of stresses on the impacted community. The labor requirements associated with the construction and extraction phases of individual technologies vary markedly, and are the chief cause of these differences.

The policies of contractors or subcontractors regarding rotations and the provision of housing facilities may also affect impacts. Experience with the Alaska pipeline demonstrated that a 30-day work rotation attracted workers from the lower 48 states; a 10-day work rotation attracted Alaskans from Fairbanks; and a five to seven-day work rotation attracted Alaska Natives to the work force.

6.3.2.5 Community Attitudes. A community's values and goals affect the nature of impacts by setting priorities for the provision of public services. It is not uncommon to find a community insisting on an increase in medical services when other demands are more immediate. The attitudes of the community also affect impacts by influencing the political choices that an impacted community makes. One example is the exercise of the police power; certain kinds of land use control may not be acceptable in a rural community.

6.3.2.6 Pace of Development. The faster the growth rate, the more likely the growth will produce stresses which generate impacts. Clearly, 1,000 new jobs introduced into a small community over five years will have a less damaging effect on that community than would the introduction of the same number of new jobs within a six-month period. The pace of development is similar to uncertainy, in that it tends to aggravate other difficulties.

6.3.2.7 Existing Infrastructure Commitments. Excess capacity in a specific category of public facilities will clearly aid a community in meeting development impacts, and may naturally affect the community's overall perception of the impact problem. This excess or flexible capacity may include administrative services as well as public facilities. Appalachian communities, served by substate planning districts supported for years by the Economic Development Administration and the Appalachian Regional Commission, will be less likely to need certain kinds of rudimentary technical support than western communities. The demand for this technical support has in fact been far greater in the West than in the East or in the coastal zone.

Infrastructure commitments may also have a negative side. For example, water and sewer projects proposed in Raleigh County, West Virginia, provoked unfavorable reactions from pensioners already served by septic tanks. A new water and sewer network might only be financially feasible if it serves all, but user charges impose substantial hardships on established residents with fixed incomes.

6.3.2.8 Overall Population Density. Population density affects the choices available for mitigaton measures. Sweetwater County, Wyoming, is substantially larger than New Jersey and, prior to impact, was populated by approximately two persons per square mile; its population has now doubled. This will affect the design of a long-term approach to impact problems.

A sparse population may also affect the share of state and Federal resources directed to a locality, due to formula allocations and lack of political strength.

Providing an appropriate mitigation response to social and economic impacts is a complex institutional problem. Local governments address impact problems with choices to regulate or to finance improvements and operations, although these choices may be legally or practically limited. State governments affect impact problems through regulatory agencies (land use, facility siting, environmental control, etc.), through state-financed impact relief, and through Federal programs administered by the states. The Federal government offers an additional structure of regulation and financial support, and the private sector may provide its own resources to address certain impact problems.

The Department's role in this complex picture is, of necessity, limited. The most profound limitation is on its capacity to target direct financial assistance for planning, strengthening institutional capacity, operations, or capital improvements. Under Section 35 of the Mineral Leasing Act of 1920, as amended by Section 317(a) of the Federal Land Policy and Management Act of 1976, 50 percent of mineral leasing royalties, rentals, bonuses, and fee sales are returned directly to the states to be distributed according to state law. In spending those funds, the states are directed to give priority to those subdivisions of the state socially or economically impacted by development of minerals under the Mineral Leasing Act. The funds are to be used for planning, construction and maintenance of public facilities, and provision of public service.

A loan program for impacted areas, secured by future royalties, has not been implemented. This program was established under Section 317(c) of the Federal Land Policy and Management Act. All loans would bear an interest rate comparable to the best rates available in the municipal bond market. The loans are limited to 55 percent of the anticipated mineral revenues due a state for the following 10-year period. The Department has circulated proposed regulations for this loan program (43 CFR 1880) setting out procedures under which the loans may be made. Thus far, funds have not been appropriated for this program.

An important social and economic impact mitigation feature of the Department's preferred program and several other alternatives is the emergency leasing program. This program is provided in large part specifically to avoid the hardships of sudden mine closings. Of concern is not only the unemployment caused directly by

such closings, and the consequent disruption of lives, but also the underemployment of still usable community facilities and services that might have to be replaced elsewhere if production were satisfied through development of new mines in previously undeveloped areas.

The Department does not have the authority to directly influence the decisions of the Federal, state, local, or private entities that might provide impact funding. The Department cannot, for example, significantly affect use of the Economic Development Administration's Title IX program. The Department cannot dictate priorities to state agencies such as Montana's Coal Board. Nor can the Department appropriately play a role in persuading a local government to pass a bond issue for needed improvements. Finally, it does not appear to be legally possible for the Department to require private financial assistance through requirements in lease stipulations. The task of providing mitigation rests primarily with the states.

Indeed, the Department is not in a strong position to substantially affect most of the factors discussed in Section 6.3.2—physical characteristics, economic structure, local leadership, legal framework, community attitudes, existing infrastructure commitments, or overall population density. What the Department can do is influence, and in some cases determine, the location, timing, and nature of development. Instead of providing a response after the commitment to development is made, the Department's authority must focus on the decisions that surround the initial commitment to proceed. Mine openings might be spaced out over time to avoid sharp changes in employment levels. Impacts on an area following mine closings must also be considered. The Department, thus, can play an effective role in planning tract sales to minimize or avert impacts at early stages of the development process. The Department is required by Section 522 of the Surface Mining Control and Reclamation Act of 1977 and Section 202 of the Federal Land Policy and Management Act of 1976 to coordinate with and to consider state and local land use and management resource programs in its own general planning processes. Two of the unsuitability criteria, the buffering of state lands unsuitable and state nominations of additional criteria, are directed at fostering this coordination. Additionally, criteria on historic land and sites, natural areas, state listed endangered species, municipal watersheds, state resident fish and wildlife, and national resource waters provide for direct state or local participation. The Department will also rely on comments from the state and local governments in activity planning (including state participation on the regional coal teams) as a prime source of information in determining where avoidance of an area is warranted because of social or economic impacts. Further, the Department can effectively work to close four of the five gaps in existing mitigation mechanisms which were indentified in the report.

- Information – The Department could make all information generated in the coal management program which is not proprietary available to state and local governments as promptly as possible and could use lease stipulatons to ensure disclosure of timely and accurate private sector information, and to ensure consultation of the private sector with affected governments.
- State/Local/Tribal Participation in Decisionmaking Process — The Department is ideally situated to consult with and examine development consequences with affected state and local governments prior to making decisions that might unduly burden these governments with undesirable or unmanageable responsibilities for development impacts.
- Planning and Management – Despite the inability of the Department to provide additional direct financial assistance, state, local, and area-wide institutional capacity could be stimulated by timely and consistent Departmental efforts to jointly consider development consequences.
- Coordination of Assistance Mechanisms – While the Department has no direct authority to influence other Federal programs, timely and consistent consultation with other agencies might indirectly affect program priorities.

The preferred program and several other alternatives would provide for and, in fact, emphasize each of the Departmental responses suggested above. Particularly important are the early, frequent, and special access procedures for state government designed into all significant steps of the preferred program and several other alternatives and the special focus given to consultation

with state governments on the location and timing of lease sales.

In sum, the sensitivity of the land use and activity planning processes assume particular importance for mitigating social and economic impacts. A sensitivity to the social and economic consequences of development presents difficult challenges to the planning system, since the optimum management of Federal resources for strictly Federal purposes may produce intolerable consequences for non-Federal governments. This may ultimately prove the strongest basis for adopting the preferred program and proceeding with renewed coal leasing, since renewed coal leasing offers the opportunity to modify the spatial pattern of coal development in response to such policy concerns.

6.4 REFERENCES

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2. Energy Impact Assistance Steering Group, March 1978. Report to the President: Energy Impact Assistance. U.S. Department of Energy, IR0009 UC-13, Washington, D.C.

CHAPTER 7

LONG-TERM ENVIRONMENTAL CONSEQUENCES OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

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CHAPTER 7

LONG-TERM ENVIRONMENTAL CONSEQUENCES OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

This chapter presents long-term environmental consequences of the Federal coal management program alternatives. Adverse impacts which cannot be avoided are described in Section 7.1. Section 7.2 discusses irreversible and irretrievable commitments of public resources required to support the alternatives. Section 7.3 addresses losses of long-term productivity versus short-term uses of public lands. Unless otherwise noted, the discussions in these sections are in the context of the preferred Federal coal management program. In deriving the impacts in Chapter 5, all mitigating measures required by law or regulation in a coal management program were considered to be in operation. Thus, the impacts described in that chapter can be considered as those unavoidable under the various program alternatives. This chapter is largely a summary of the material presented there, highlighting the results that need to be considered under long-term environmental consequences. Nearly all the effects discussed here are subject to some form of control, both in the pre-leasing and post-leasing program structures.

7.1 UNAVOIDABLE ADVERSE IMPACTS

During all activities associated with the coal development cycle (exploration, mining, beneficiation, transportation, conversion, and use), programmatic measures would be in operation to mitigate potentially adverse environmental impacts. Nevertheless, it is expected that there would be certain adverse impacts which could not be avoided regardless of the level or types of mitigation employed. This section provides a qualitative discussion of these unavoidable effects. To prevent considerable repetition, the effects are discussed on a general basis with significant regional differences identified where appropriate.

7.1.1 Physical Environment

7.1.1.1 Topography. Topographical features would be unavoidably altered by construction and mining. Construction activities could result in the filling of areas of low relief, the leveling of rolling terrain, and the removal of prominent points of land. In addition, construction of water impoundments would result in the inundation of large areas of land and would completely alter the topography of such areas. Such impoundments are regulated under the Surface Mining Control and Reclamation Act of 1977, but will still result in residual effects on topography. Mining activities, especially surface mining, would result in the disturbance of extensive surface areas. Reclamation would, to a large extent, restore the topography to approximate pre-mining contours in many areas. Subsidence of land would also unavoidably result from some underground mining activities.

7.1.1.2 Soil. Due to the nature of surface mining, and to a lesser extent underground mining, some quantities of native topsoils would be mixed with or buried under mining wastes or lost through erosion. These soils constitute a valuable natural resource which would be irrevocably lost. The Surface Mining Control and Reclamation Act contains several provisions designed to control and minimize the soil loss. With reclamation, new soils would form over time; however, in some areas of the West, particularly the more arid regions, hundreds of years could be required for natural processes to reestablish fertile soils.

7.1.1.3 Archaeological and Historical Resources. Even though coal production activities are accomplished within the framework of existing protective laws and regulations, there would be some loss of archaeological, cultural and historic resources within each coal region. In no case, however, should this loss involve a significant site or a significant assemblage of sites if strict enforcement of statutory requirements and application of unsuitability criteria and other elements of the preferred program and alternatives are maintained. Moreover, surveys required under existing

regulations could add to the cultural resources data base.

7.1.1.4 Paleontological Resources. Coal deposits and overburden material inevitably contain fossil remains. Although significant fossil remains could be lost through mining and mine-related activities, the number and amount of such losses would be minimized by the imposition of recovery stipulations. Criteria and guidelines for protection and recovery of such resources are presently being developed. It is not possible to meaningfully estimate the extent of potential loss of this nonrenewable resource.

7.1.1.5 Water Resources. Water would be required for coal mining in all of the coal regions; additional water would be required for developments of supporting activities and the population associated with coal mining, conversion, and use. In water-short regions, the large volumes of water withdrawn for coal development could be available for agricultural, industrial, commercial, and residential uses. Generally, however, much of this water would re-enter the water regime and be available for such other uses. If coal production were accompanied by development of power plants, gasification plants, or other conversion facilities, consumptive water uses and conflicts with other users would increase. Water exists in sufficient quantities in the three Appalachian Coal Regions and the Eastern Interior Coal Region to support coal development; however, water quality can be of concern. In the Western Interior, Texas, San Juan River, Uinta-Southwestern Utah, Fort Union, Green River-Hams Fork, and Powder River Coal Regions, sufficient water would generally be available on an annual basis, although shortages might occur during the predictable and regular low flow periods or under drought conditions. In the Denver-Raton Mesa Coal Region, water might not be available, even on an annual basis, to support projected coal-related and other developmental activities.

Adverse impacts resulting from some breaching and draining of aquifers during coal mining could not be avoided. The loss of local aquifers can be quite important in the Powder River, Fort Union, and Texas Coal Regions. Here, lowering of water levels may dry up springs and seeps or reduce stream flows. Replacement of aquifers with material of differing water holding capabilities than those present prior to mining would disrupt groundwater flow patterns and could reduce aquifer storage capacity.

Disruption of existing surface drainage patterns and development of lakes and ponds could result from surface mining, especially where thick coal seams with thin overburden layers are mined. The Surface Mining Control and Reclamation Act specifically seeks to mitigate this effect. Water use in the area could be adversely affected to the extent that stream flow regimes would be changed by channel modifications. In addition, there could be an increased loss of water by evaporation from standing bodies of water.

Increased mining would also create a potential for some unavoidable degradation of local and regional water quality. Construction and mining activities would result in increased erosion, runoff, and sedimentation. Acid mine drainage could occur, primarily in the eastern coal regions. Alkaline mine drainage could occur in some western regions. The operation of coal conversion and utility plants would produce potential water pollutants including dissolved solids, ammonia, non-degradable organic compounds, oxygenated compounds, sulfur compounds, cyanides, phosphates, and trace elements. All of these effects are subject to controls. Even with controls, coal mining would pose some small risk of their occurring and polluting surface or ground water. Consumptive uses could also increase salinity and concentrations of pollutants downstream from the point of diversion where the water had previously been diluting other sources of water pollution. Population associated with coal mines and conversion and mine-mouth plants would introduce increased salts, nutrients, organic materials, bacteria, fertilizers, pesticides, trace elements, heavy metals, etc., into surface waters, especially where they overtax existing sewage treatment facilities.

A general scenic degradation would occur as a result of coal mining, conversion, and use, though the unsuitability criteria on designated wild and scenic rivers and on visual resource areas are aimed at eliminating this possibility. Scenic rivers and other water related recreational activities could be adversely impacted. The waters themselves could be degraded or the land through which the water flows could be affected to such an extent that many of their aesthetic properties would be lost.

The consumptive use of water by secondary or induced energy-related or industrial activities, such as mine-mouth steam electric generating plants, may further degrade water quality in certain streams and rivers by increasing dissolved solid concentrations and by reducing the assimilative capacity for other pollutants as a consequence of reduced water flows.

Since water is a renewable resource, short-term consumption to support coal mining should not greatly affect future availability. The construction of impoundments could result in locally increased reliability of water supplies. On the other hand, the removal of native topsoil could alter drainage patterns and render large surface areas impervious with the result that groundwater levels and pressures would be lowered, thus reducing the future productivity of some aquifers. The use of large amounts of the available water supply during the active life of a mine in water-short regions could result in a significant shift in the local uses of water in other activities; most typically a decrease in irrigated agriculture in relation to urban and industrial water uses. These shifts could outlive local coal mining and affect the long-term regional water use patterns.

Significant long-term changes would result from a decline in water quality resulting from coal development. The long-term quality of the available water supply would probably decline due to the discharge of industrial and municipal wastes, the increased sediment load from construction-related activities, possible return-flow effects, and changing consumptive patterns, including construction of impoundments. Increased salinity in the Colorado River Basin is a major issue of national and international concern. A reduction in water quality could result in restrictions on the productive uses of surface and ground water. Decreased water quality would also have impacts on long-term biological productivity in streams and rivers.

7.1.1.6 Air Quality. Degradation of local air quality would unavoidably occur in all regions as a result of projected levels of 1985 and 1990 coal development under any of the Federal coal management alternatives. Some potential damage to plants, animals, and human health from air pollutants would be unavoidable. Some increases in sulfur oxides, nitrogen oxides, carbon monoxide, carbon dioxide, hydrocarbons, trace elements, and particulates would occur in all regions even though best available emission control technologies are employed and air quality standards are enforced. A long-term warming trend in the earth's climate might result from the build-up of carbon dioxide in the atmosphere - the greenhouse effect.

7.1.2 Ecological Resources

Coal development would affect ecological systems through the unavoidable disruption of habitats, food chains, predator-prey relationships, behavior patterns, and various activities of species playing key roles in the ecosystem. The coal management program would go to great lengths to avoid these impacts. Several of the unsuitability criteria have as their purpose the avoidance of wildlife impacts. In addition, a very active wildlife program has been proposed, including participation by the U.S. Fish and Wildlife Service (see Appendix B). Terrestrial ecosystems would be affected by land clearing activities, increased presence of human activities in formerly remote areas, changes in air quality, and decreases in soil productivity. Aquatic ecosystems would be affected by changes in water quality, changes in stream hydrology, activities which dry up aquatic habitats, and the construction of reservoirs which would change river ecosystems to lake ecosystems.

Existing vegetation would be destroyed on sites used for mining, solid and liquid waste disposal, community expansion, and the developments of related activities. In addition, increased populations in presently undeveloped areas of the coal regions would intensify recreational activities on lands formerly not subject to intensive activities, resulting in destruction or reduction of wildlife and habitat. At mining sites, reclamation would be required to restore vegetation so that the land would, at the least, be capable of supporting former uses. However, all reclamation efforts would not likely be completely successful in restoring the exact pre-mining conditions, especially on some severely disturbed mine areas which have both low precipitation and infertile soil. Mining will not be allowed on lands that cannot be reclaimed because of physical limitations. In the drier areas of the West or in areas with high evapotranspiration rates, it is possible that many decades could pass before natural vegetation and soil conditions could be restored to disturbed

areas, even with reclamation. Bonding is required to ensure reclamation activity will continue even after the active life of the mine. In the Appalachian Coal Regions, acid drainage could hinder revegetation efforts. Revegetation of an area may result in a plant species composition drastically different from that which existed prior to development if it is for a more beneficial use. Reclamation efforts, on the other hand, may attempt to restore the original use but with an entirely different mix of species. Either way, coal mining could have lasting effects on the ecology of the local area.

Loss of wildlife habitat and reductions in wildlife populations would occur as unavoidable consequences during the mining and use of coal. Some displacement and mortality of animals would occur in all regions.

Mining, transportation, and processing of coal would expose wildlife to various hazards and disturbances. Blasting, construction, and other noises associated with the mining activity would be unavoidable and would frighten away some wildlife species. Reproductive and migratory behavior could be affected.

Destruction of existing aquatic habitat and fauna would occur where streams are altered by mining or by construction of reservoirs. Reduction of water quality as a result of development would also adversely affect aquatic life. For example, increased sedimentation of waters could result in the elimination of those species which require clean gravel for spawning. Changes to or elimination of ponds, streams, and potholes would also adversely affect waterfowl.

In many areas, wildlife would return both during and after reclamation efforts, providing adequate water sources are available. In most cases, however, the diversity, density, and composition of the new populations would be altered from previous conditions.

7.1.3 Community Resources

The influx of a relatively large number of people into a region as a result of coal development could exert a major influence upon the region; primarily, this growth affects existing communities located near the areas of development. The potential impacts to a community would depend on the relative size and the rate of population increases, the existing infrastructure, and the adequacy of any advanced planning for growth. Other factors affecting community ability to absorb growth include past experience with growth phenomena and mining. There could be instances, however, where large and rapid increases in population would unavoidably create growth rates reaching "hyperurbanization" levels. This is particularly true in more rural western regions where existing base populations of communities are often small compared to the rapid increase in construction and operating work forces related to coal development. Furthermore, the communities in the western coal regions usually have had much less experience with coal mining and growth phenomena than have towns in the eastern coal regions.

Financing and construction of facilities for education, fire and police protection, housing, water and sewer distribution, and health-medical care delivery systems take considerable lead time and often these facilities cannot be developed rapidly enough to accommodate rapid population growth. Local governments may experience severe problems in raising the capital to expand necessary facilities and services, thus creating hardships for long-term residents as well as newcomers.

Shortages of housing and other facilities and services, combined with higher wages of industrial workers, could create inflationary trends most adversely affecting established residents, particularly those on fixed incomes. Hope for higher wages may also lead to an influx of workers seeking employment opportunities in excess of available jobs.

Most rural communities have well-defined and long-established networks of social and political relationships. It is likely that, in such a community, these groups would be fragmented by the intrusion of relatively large numbers of persons who, in effect, would create a new social order. Even were this not to occur, conflicts would inevitably develop between the in-migrating construction and operation workers and the local population over differing personnel, economic, and social values. This could lead to an overall deterioration of the quality of life for everyone in the community.

The extent to which these conditions are unavoidable would be related to the size of the population influx compared to the size and stability of the base population of the given communities. Increases in most of the eastern coal regions such as the Appalachian Coal Regions may

be incrementally small because of the existing high level of coal development there. Conversely, western coal regions could experience large population changes compared to their baseline levels. This is particularly true in the Powder River Coal Region and some of the other more rural areas of the West.

7.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF PUBLIC RESOURCES

Once coal is mined, it cannot be replaced. However, this is not the only coal that is lost. Some coal is not recoverable in the process of mining. An average of about 85 percent of the coal resource can be recovered when area surface mining methods are used. Only about half of the coal in underground mining can be recovered, especially when seams are thick. Basically, this is because coal must be left to support the ground above the seam being mined. The preference expressed by the Secretary for the maximum economic recovery policy to be included in the preferred program is meant to mitigate this effect.

Production of coal from Federal lands through 1977 totals about 448 million tons. An additional 15 to 50 percent of this production may have been lost in the mining process. In 1977 alone, coal production from Federal lands was 52 million tons, or nearly 12 percent of the total produced during the past 200 years.

Table 7-1 shows the amounts of projected coal production by regions for the various Federal coal management program alternatives. Under a high coal production projection for the preferred program, for example, approximately 1.2 and 1.9 billion tons of coal would be mined in the years 1985 and 1990, respectively. An additional amount of coal, roughly about 600 and 940 million tons, respectively, would not be recoverable using current mining methods. Less coal would be lost with the Federal program in place than without it because of imposition of the maximum economic recovery requirement and emergency leasing.

As noted in Section 7.1.1.5, those aquifers drastically disturbed during mining or groundwater use may be irreversibly changed. Additionally, if large quantities of groundwater were to be pumped from thick aquifers, irreversible ground subsidence could occur, including compaction of the underlying aquifer. The quality of water in some aquifers could be irreversibly changed as, for example, when pumping of high quality water permits infiltration by lower quality water. Leachates from solid and liquid wastes of coal facilities could also cause irreversible changes to groundwater quality.

The other principal changes would be:

- Some drainage patterns would be irreversibly changed by mining and construction activities. Changes in drainage could lead to irreversible alterations to surface water hydrology.
- Fuels, electric power, lubricants, explosives, structural materials, capital, and manpower committed for coal development would be irretrievably lost to other uses.
- On those areas reclaimed to premining vegetation, it is doubtful that total reestablishment of the native plant communities to the same level of diversity would be initially possible. The number of exotic species may increase, at least initially and during the early phases of reclamation.
- A considerable portion of land use changes accompanying coal mining would be permanent since areas shifted to industrial and residential uses would likely remain committed to these uses.
- Where crop, grazing, and forest lands could not be restored to former productivity, there would be an irretrievable loss of productive capacity.
- Unidentified historical, archaeological, and paleontological sites would be destroyed by mining and construction activities and irretrievably lost.
- Less tangible values that would be irretrievably lost include areas of natural beauty and those of unique geologic significance as study sites.

7.3 LONG-TERM PRODUCTIVITY LOSSES VERSUS SHORT-TERM USE OF LANDS

7.3.1 Trade-Off Analysis of Multiple Uses of Public Lands

Many changes would be associated with the development of coal resources, and, in particular, surface mining, due primarily to the long-term nature of the land alteration. In many past

TABLE 7-1

COAL PRODUCTION SUMMARY
(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLA's ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1985 PROJECTIONS										
Northern Appalachian	176.0	208.3	211.7	217.5	208.4	211.6	216.7	211.8	211.7	210.4	211.5	211.1
Central Appalachian	206.8	202.7	205.5	178.8	202.7	204.4	175.9	205.6	204.8	192.5	203.4	211.0
Southern Appalachian	23.4	18.0	27.5	42.7	18.0	26.6	40.6	26.5	27.5	31.6	22.1	23.0
Eastern Interior	136.4	209.0	206.1	172.4	209.0	209.7	161.0	206.0	207.1	196.1	203.4	212.6
Western Interior	11.5	12.7	14.2	14.2	12.6	13.6	14.5	13.7	14.2	8.2	10.8	15.8
Texas	14.1	62.4	64.0	48.6	62.5	66.3	35.3	63.7	64.6	50.2	57.7	78.6
Other East	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TOTAL EAST	568.2	713.1	729.0	674.2	713.2	732.2	644.0	727.3	729.9	689.0	708.9	752.1
Powder River	37.4	150.0	204.8	275.0	150.0	205.0	300.0	205.0	205.0	225.0	204.6	183.7
Green River-Hams Fork	25.7	40.0	76.0	99.6	40.0	80.0	130.0	77.9	77.0	112.0	112.0	57.5
Fort Union	11.4	16.9	31.9	51.9	16.9	31.9	51.9	31.9	31.9	36.9	21.9	37.4
San Juan River	8.8	15.0	24.8	39.7	15.0	25.0	40.0	24.8	24.8	30.0	22.1	32.0
Uinta-Southwestern Utah	10.2	15.0	29.6	44.5	15.0	30.0	45.0	30.0	29.7	35.0	26.4	29.4
Denver-Raton Mesa	1.9	2.0	5.0	10.0	2.0	5.0	10.0	5.0	5.0	6.0	6.0	7.0
Other West	10.4	18.3	4.2	6.7	18.3	3.0	6.7	3.8	3.8	6.8	6.6	1.8
TOTAL WEST	105.8	257.2	376.3	527.4	257.2	379.9	583.6	378.4	377.2	451.7	399.6	348.8
TOTAL U.S.	674.0	970.4	1,105.3	1,201.6	970.4	1,112.1	1,227.6	1,105.7	1,107.1	1,140.7	1,108.5	1,100.9

TABLE 7-1 (Concluded)

COAL PRODUCTION SUMMARY

(million tons)

COAL REGIONS	1976	NO NEW LEASING			PREFERRED PROGRAM			PRLAs ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	MEET DOE GOALS	STATE DETER-MINATION
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
		1990 PROJECTIONS										
Northern Appalachian	176.0	193.8	219.4	261.5	193.8	220.1	252.8	219.4	219.6	217.8	222.3	225.3
Central Appalachian	206.8	191.3	211.2	237.8	191.2	206.2	217.6	210.5	210.0	203.0	205.5	225.4
Southern Appalachian	23.4	15.6	26.4	42.8	15.6	25.4	40.4	26.3	26.4	30.4	14.5	14.2
Eastern Interior	136.4	275.7	331.5	351.1	274.7	319.7	280.1	314.4	328.0	284.6	312.5	381.1
Western Interior	11.5	13.1	25.5	58.5	12.7	17.1	14.0	19.3	24.2	10.2	10.1	35.0
Texas	14.1	74.0	119.4	154.0	73.0	86.1	100.0	116.4	115.8	58.9	79.6	111.0
Other East	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TOTAL EAST	568.2	763.5	933.4	1105.7	761.0	874.6	904.9	906.3	924.0	804.9	844.5	992.0
Powder River	37.4	175.0	305.0	335.0	175.0	400.0	600.0	355.0	316.0	450.0	396.1	269.1
Green River-Hams Fork	25.7	66.5	98.7	119.0	70.0	120.0	175.0	101.0	104.2	150.0	149.5	62.8
Fort Union	11.4	21.9	51.0	94.9	21.9	41.9	81.9	47.4	50.6	51.9	22.5	54.4
San Juan River	8.8	25.0	59.4	77.3	25.0	50.0	75.0	54.9	58.4	60.0	57.7	63.0
Uinta-Southwestern Utah	10.2	19.8	45.0	65.0	20.0	40.0	60.0	42.0	44.8	50.0	28.3	36.8
Denver-Raton Mesa	1.9	5.0	10.7	15.0	5.0	10.0	15.0	10.5	10.6	10.0	7.5	10.3
Other West	10.4	14.4	10.3	7.7	14.4	10.7	9.1	8.6	10.2	3.7	8.3	14.1
TOTAL WEST	105.8	327.6	580.1	713.9	331.3	672.6	1016.0	619.4	594.8	775.6	669.9	510.5
TOTAL U.S.	674.0	1091.1	1513.5	1819.6	1092.3	1547.2	1920.9	1525.7	1518.8	1580.5	1514.4	1502.5

instances, the productive capacity of land has been essentially destroyed through the employment of ecologically unsound mining practices. Further, there is insufficient experience in restoring lands to allow any truly accurate estimates to be made of the productivity that would be expected over the long term on reclaimed lands. The Surface Mining Control and Reclamation Act requires that reclamation efforts return the area to at least its former level of use.

Adjustments in the social structure of many communities will be needed as a result of coal development. These include adjusting to new social situations and living with people whose habits and values are different from those previously encountered. There may be frustrations, problems, and reductions in social welfare for both newcomers and long-time residents in the coal development areas. Prediction of the intensity and persistence of this social disruption or its consequences is not possible in a programmatic environmental impact statement.

7.3.2 Time Frame of Coal Leasing

The present Federal coal management program diligence requirements set exhaustion of new logical mining unit reserves within a 40 year period. The average mine is actively in production for about 30 years. Other time dependent elements of the program include:

- Production starts - within 10 years of lease.
- Initial lease term - 20 years.
- Lease renewal term - 10 years.

The management program as presently structured represents a long-term commitment of resources, e.g. 30-40 years. However, not all of the area of a lease is removed from other productive uses. For a surface mine, only a minor part might be actively mined at any one time. Disturbed lands generally enter the reclamation cycle simultaneously with active mining and can be available for other productive uses before shutdown of production. The only exception would be areas committed to long-term use such as building sites, roads, storage facilities, etc. Where areas are reclaimed soon after use, the time for alternative uses foregone and productivity losses experienced typically ranges between five and 15 years. Under the permanent surface mining regulations, mines will find it to their advantage to reclaim disturbed areas quickly.

7.3.3 Productivity

Reclamation efforts and natural revegetation of strip-mined areas would be initiated once the coal resource has been removed. Areas around buildings and other coal development related facilities would likely be revegetated and landscaped once construction of these structures was completed.

In Chapter 5, impacts to natural and agricultural productivities due to land disturbances were presented based on total land requirements between 1976 and 1990. These requirements include both long-term and short-term losses.

Long-term losses of natural productivity would occur on areas committed to hard surface, buildings or other permanent types of structure, and to areas committed to a major change in land use (e.g., land required to support coal related population increases). While there is a potential to return these areas to some stage of natural production, it is unlikely that such a change would occur in the near future.

Short-term losses of natural productivity would occur in areas subject to disturbances that would be alleviated over time (indirect or secondary impacts), and areas that have a potential for being returned to some level of natural production. Such areas include buffer zones around facilities, areas around buildings that would be landscaped, and land required for mining. Estimates of the amounts of land subject to long-term or short-term losses under the preferred leasing alternative medium level production are presented in Table 7-2.

The amount of time required to achieve some return of productivity to short-term land losses will be dependent on actual land use objectives. Reclamation to commercially harvestable forest in the Appalachian and Eastern Interior Coal Regions would take between 25 and 30 years for coniferous species and between 75 and 80 years for hardwoods, based on present silvicultural techniques [1]. Reclaiming the land as cropland could occur within one to two years of soil restoration in some cases.

Estimates of time to reclaim rangeland to premining productivities range from about one year in the Texas Coal Region [2] to 10 years in the Powder River Coal Region and 14 years in the Uinta-Southwestern Utah Coal Region. These are estimates, not precise forecasts, and only more research and experience will develop reliable

TABLE 7-2

ESTIMATES OF LONG TERM/SHORT TERM LOSSES OF TOTAL LAND REQUIRED BETWEI
1976 AND 1990 UNDER THE PREFERRED COAL LEASING ALTERNATIVE,
MEDIUM LEVEL PRODUCTION
(acres)

REGION	LONG TERM LOSSES(a)	SHORT TERM LOSSES		TOTAL
		SUBJECT TO SECONDARY DISTURBANCES(b)	ACTIVELY DISTURBED(c) RECLAMATION REQUIRED	
Northern Appalachian	37,598	15,178	97,010	149,786
Central Appalachian	20,246	8,919	108,085	137,250
Southern Appalachian	23,008	9,373	22,333	54,714
Eastern Interior	57,886	14,408	97,872	170,166
Western Interior	39,661	14,521	25,528	79,710
Texas	60,816	21,325	55,575	137,716
Powder River	36,154	5,511	59,925	101,590
Green River-Hams Fork	8,722	5,972	69,235	83,929
Fort Union	12,604	3,727	19,250	35,581
San Juan River	8,797	2,005	24,280	35,082
Uinta-Southwestern Utah	9,906	1,898	2,605	14,409
Denver-Raton Mesa	8,963	2,494	3,808	15,265
TOTAL	324,361 (32%)	105,331 (10%)	585,506 (58%)	1,015,198

(a)Committed to "permanent" structures, hard surface areas, or to a major change in land use (e.g. land for coal related population increased.
(b)Areas adjacent to facilities that are undeveloped.
(c)Primarily land required to produce coal.

information about restoration of long-term productivity in the grasslands and other semi-arid and arid areas of the West.

7.3.4 Wildlife

The potential for returning wildlife to reclaimed areas would be directly dependent upon the success of the vegetation reclamation efforts and reclaimed uses of the land. The time to recover stable wildlife populations is highly dependent on individual species characteristics. The long-term reestablishment of wildlife populations must be considered in terms of the short-term, site-specific losses of both species numbers and habitat. This is directly related to the acreage commitments during the average 30-year life of a given mining site. As specific mining tracts are not identifiable in this statement, it is not possible to specifically identify habitats which would be disrupted. Nevertheless, any surface mining operation would result in a temporary loss of habitat for certain species.

Wildlife reestablishment will closely follow the successional stages of vegetation. Areas successfully replanted in seedlings, for example, would be expected to follow a typical pattern for both plant and animal species. Windblown seeds that become established along with planted seedlings would increase plant diversity and provide additional opportunities for wildlife feeding, cover, and reproduction. The first inhabitants of a reclaimed area would include soil organisms, insects, and other arthropods, and rodents, followed by small mammals, foxes, and ground nesting birds.

Usefulness of range reclamation to wildlife will depend upon the eventual mix of plant species that first establish themselves and the succession that follows. Replanting with vegetation of only one type, as under cultivation, could limit the benefits to wildlife. Control of undesirable plant species and protection of newly established vegetation from grazing animal species may also be required for several years before reclaimed areas can be deemed successful in terms of maximum wildlife benefits.

7.4 REFERENCES

1. Curtis, W., 1978. Personal communication. Northeast Forest Experiment Station. Berea, Kentucky.

2. Payne, R., 1978. Personal communication. Railroad Commission of Texas, Surface Mining Department.

CHAPTER 8

CONSULTATION AND COORDINATION

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CHAPTER 8

CONSULTATION AND COORDINATION

Shortly after assuming the post of Secretary of the Interior, Secretary Andrus requested a review of the status of Federal coal leasing, including the lack of new leasing, the 1975 environmental impact statement on the then proposed leasing program (see Section 1.2.4), the new statutory base for leasing (see Section 1.3.1), and the *NRDC v. Hughes* suit which challenged the legal adequacy of the 1975 statement (see Section 1.2.6). The reviewers found that the 1975 program had been outdated by the new statutes and, furthermore, was not compatible with the policy objectives of the new Administration; that the plaintiffs' arguments in the law suit were likely to prevail; and that significant, new Federal leasing probably could not and, moreover, should not begin until a new Federal coal management program which complies with the law and meets Presidential and Departmental policy objectives is prepared and the need for renewed leasing is assessed. The decision to design a new coal management program and prepare a new programmatic environmental impact statement was announced to the public in a July 25, 1977, Departmental press release.

Responding to these findings, the Secretary ordered a full-scale interagency coal policy review which, among other things, would assess the need for leasing and initiate the development of a new Federal coal management program. A review committee, composed of the Solicitor and Assistant Secretaries of the Department was formed. The Office of Coal Leasing, Planning, and Coordination was established at the Departmental level to coordinate the review. Three events in 1977 gave impetus to the review: the April 29, 1977 publication of the National Energy Plan which emphasized coal as the principal domestic fuel to reduce our dependence on imported oil and gas and called for a doubling of coal production by 1985; the President's May 23 Environmental Message to the Congress and May 24 Memorandum to the Secretary which called upon the Secretary to develop an environmentally sound coal management program; and the September 27 decision in *NRDC v. Hughes* enjoining the Department from engaging in major leasing activity until certain conditions were met (see Chapter 1 for a discussion of these events). Although the court order only required the publication of a supplement to the 1975 environmental impact statement, for the reasons discussed above the Secretary maintained his decision to prepare a wholly new draft environmental impact on a newly designed preferred coal management program.

Since these events, the Department has offered numerous opportunities for public participation and has consulted with expert Federal and state agencies, state governors and their representatives, trade associations and individual companies, environmental associations, community groups, and other organizations with expertise on coal development issues on the development of the preferred coal management program and the preparation of this statement.

8.1 PROGRAM DEVELOPMENT COORDINATION

The process of selecting the preferred new Federal coal management program began in October 1977 and continued through March 1979. The first step in the process was the convening of task forces assigned to specific issue areas. These task forces were staffed with coal, land use planning, and other specialists drawn mostly from the Bureau of Land Management, the Geological Survey, the Fish and Wildlife Service, and the Office of Policy Analysis. Each task force developed and submitted to the Office of Coal Management, Bureau of Land Management, a background issue paper which was made public and continues to be available from the Bureau of Land Management upon request. The Office of Coal Leasing, Planning, and Coordination reviewed these papers and from them prepared concise issue option papers which were submitted to the Secretary or Under Secretary. (These issue option papers, listed

in Table 3-1, were also made public and continue to be available from the Bureau of Land Management upon request.) The Secretary or Under Secretary circulated the issue option papers to the Assistant Secretaries and the Solicitor for comments and recommendations on which issue options should be selected. After all comments and recommendations were also circulated among the Assistant Secretaries and the Solicitor, they or their representatives met and discussed the comments and recommendations with the Secretary or Under Secretary. The Secretary or Under Secretary subsequently selected the option he preferred under each issue presented to him in the issue option paper or papers then under consideration. These preferred options formed the bases of the preferred program in this statement. Program development was coordinated with the states, industry, environmental groups, citizens organizations, and Indian tribes in the West by the Denver based Assistant to the Director of the Office of Coal Leasing, Planning, and Coordination.

In addition to the program development coordination described above, the Bureau of Land Management conducted interagency consultations concerning jurisdictional authorities and responsibilities. Major coordination activities have taken place between: (1) BLM and the Fish and Wildlife Service (FWS) concerning coal related wildlife management responsibilities, (2) BLM, U.S. Geological Survey (USGS), and the Office of Surface Mining Reclamation and Enforcement (OSM) concerning pre- and post-lease coal management responsibilities, (3) the Advisory Council on Historic Preservation, BLM, USGS, and the OSM concerning the protection of cultural resources on Federal lands, (4) between BLM and the Forest Service (FS), Department of Agriculture, concerning application of unsuitability criteria national forest system lands, and (5) between BLM and the Small Business Administration on small business coal lease set aside sales. A Memorandum of Understanding (MOU) was completed between BLM and FWS on September 26, 1978 (Appendix B). Additional MOU's are currently being negotiated.

The Department has met on a quarterly bases with the Department of Energy through the Leasing House Committee (see Section 1.3.2.2) and has worked closely with the DOE Office of Leasing Policy Development in developing the preferred program. The Department negotiated a Memorandum of Understanding with the Department on Energy concerning the setting of energy minerals production goals (see Appendix B). The Department's Office of Coal Leasing, Planning and Coordination and the Assistant Secretary, Land and Water Resources, have held several briefing and information-gathering meetings in the West, beginning in January 1978 with representatives of the western states Governors' Offices and state resource agencies to obtain state and local government viewpoints on and participation in the development of, the program. The Office and the Assistant Secretary also met with various industry groups and environmental organizations for similar purposes.

8.2 ENVIRONMENTAL IMPACT STATEMENT PUBLICATION

This section deals with consultations and coordination efforts since the original Final Coal Leasing Programmatic Environmental Impact Statement was published on September 19, 1975 [1].

Consultation efforts for this document commenced with a departmental news release on November 17, 1977, which requested the public to comment on the 1975 final environmental impact statement. A total of 265 comments were received from various governmental, industrial, and private sources. These comments were considered prior to the preparation of the draft version of this statement.

Thereafter, BLM negotiated a contract with the MITRE Corporation to assist in the preparation of the new statement. This contractual assistance commenced on April 14, 1978. Subsequently, the contractor and the Department of the Interior consulted with the organizations listed in Table 8-1 to obtain advice and information for the preparation of the draft statement.

8.2.1 Preparation of Draft Environmental Statement (DES)

Three types of consultation occurred during the preparation of the draft version of this statement (DES). Specifically, they included circulation of the DES outline, coordination with the Department of Energy to determine coal production level scenarios, and the circulation of copies of the preliminary draft environmental statement.

The Format Outline for The Coal Programmatic DES was made available via a Federal Register notice on July 31, 1978[2]. Copies for the general public were available upon request. The alternative coal production levels which serve as the basis for impact analysis in Chapter 5 were derived from production projections provided by the Department of Energy. Lastly, the preliminary draft environmental statement, PDES, which represented a "first cut" effort on the draft statement, was distributed to selected agencies for comment. In addition to Interior agencies, DOE, FS, the Environmental Protection Agency (EPA), and western state Governors' Offices received copies of the PDES and were asked to comment. See Table 8-2.

Representatives of western state Governors' Offices participated jointly with Departmental representatives in the review of the PDES. The assistance of these representatives was of substantial value in the assessment and analysis of key program issues, policy implications, and effects on state and local government policies, plans and programs. All PDES comments which were submitted in a timely manner were considered prior to the printing of the DES. Where appropriate, the statement reflected those comments.

8.2.2 Publication and Distribution of the Draft Environmental Statement

The DES was published on December 13, 1978, and a notice of availability was published in the December 15, 1978, issue of the Federal Register.

After publication of the notice of availability, 2,000 copies of the DES were initially distributed to a wide range of individuals, including Federal and state agencies and nongovernmental organizations such as conservation and environmental groups, industrial organizations, mining companies, libraries, and others. During the extended 60-day review period (45 days is mandatory), an additional 3,000 copies were distributed to other nongovernmental organizations and individuals for review and comment.

8.3 PUBLIC COMMENTS AND RESPONSES

The extended 60-day public comment period was scheduled to provide the public with the opportunity to review and offer comment on the effects of the Federal coal management program, including the preferred program and alternatives, described in the DES.

During this period, the Department placed a high priority in obtaining wide media coverage in order to allow divergent groups and individual citizens an opportunity to participate in the review process, either by public appearance at scheduled meetings and hearings or through written responses.

On December 15, 1978, Secretary Andrus released the DES at a Washington press conference during which time he stressed the need for maximum public participation. Assistant Secretary, Guy Martin delivered a similar speech in Denver, Colorado, on December 14, 1978, emphasizing the need for total public participation in the environmental statement review process. He stated, "Publication of the Draft Environmental Statement represents the first opportunity for all parties who are interested to examine and comment on the unified proposed program and its alternatives."

This theme was carried out further in a nationwide press release issued by the Secretary on December 15, 1978. Similar news releases were issued by BLM State offices during the subsequent public meetings and hearings that were held in 16 cities located in the major coal resource regions.

Individual news releases were disseminated to the following media:

Radio stations	105
TV stations	84
Newspapers	231
Newsletters	11
Magazines	9
News services (wire)	2

8.3.1 Public Meetings

In its concern with ensuring wide public involvement in the preparation of the DES, the Department took the innovative step of scheduling special, pre-hearing informational meetings for the public. The purpose of these meetings, which were held in 12 cities during early January 1979, was to fully advise the public of the contents and availability of the DES and the upcoming formal DES hearings and to provide an opportunity to interested parties to informally question those in the Department who are responsible for coal management policy decision making and preparation of the DES.

A total of 380 persons attended the 12 pre-hearing meetings held in the following locations:

January 3, 1979 —	Albuquerque, NM
January 3, 1979 —	Denver, CO
January 4, 1979 —	Salt Lake City, UT
January 4, 1979 —	Cheyenne, WY
January 5, 1979 —	Grand Junction, CO
January 5, 1979 —	Sheridan, WY
January 8, 1979 —	Price, UT
January 8, 1979 —	Billings, MT
January 9, 1979 —	Craig, CO
January 9, 1979 —	Miles City, MT
January 10, 1979 —	Rock Springs, WY
January 10, 1979 —	Bismarck, ND

8.3.2 Public Hearings

The Department of the Interior conducted (10) formal public hearings to receive comments and suggestions relative to the DES. Administrative Law Judges (ALJ) presided over the hearings which were recorded verbatim by professional court reporters.

A panel of officials representing the Secretary's Office, Department of the Interior, the Office of Coal Leasing, Planning, and Coordination, the Bureau of Land Management, and the Solicitor's office received the testimony.

At the conclusion of each witness' testimony, members of the hearing panel answered some questions within their expertise and clarified issues presented in the testimony.

Oral testimony at the ten hearings was given by a total of 74 persons and amounted to 334 individual comments and/or questions. Approximately 60 percent of these comments were directed at the functional aspects of the program. Testimony was received from a diverse group of individuals representing environmental organizatons, industry, governmental agencies, and private citizens. Comments ranged from support of the statement to requests for a complete rewrite of various sections of the program.

The public hearings were conducted at 10 different locations. Sessions were scheduled beginning at 1:30 p.m. and 7 p.m. at the locations cited on Table 8-3.

8.3.3. Public Comments

At the end of the extended review period, BLM analyzed and compiled the following statistics representing the total of all public comments:

Total attendees at all 10 hearings	360
Total witnesses at all 10 hearings	74
Total number of attendees at 12 public meetings	380
Total number of written comments (including witnesses testimony)	287
Total number of written comments (after extended 60-day period)	84
Total individual questions	1392
Total individual questions (after 60-day extended period)	385

The number of individual letters received both during and after the review period were separated into six major categories for the purpose of classifying each comment. A breakdown of these major categories and the number of comments in each category is as follows: policy comments, 891; compliance comments, 25; technical comments, 403; regulatory comments, 25; general-non specific comments, 20; and vote (expressions for or against the preferred alternative), 28.

The comments were provided by four major groups: governmental agencies, industry, environmental organizations, and private citizens. No single group dominated. The bulk of the comments were directed at the program as opposed to the DES. Industry's major concerns were that the program involved excessive governmental control. Environmental organizations were concerned that the program was driven by a desire to implement the program by 1980; that the model used during DES preparation was inaccurate; that the need for new leasing was not identified in the DES, and that the reclamation estimates were inaccurate. Governmental agencies mostly provided comments on the technical details of the DES. Lastly, private citizens expressed their concerns with the way in which they would be affected by the program.

8.3.4 Review Procedures for Handling Public Comments

During the review process, 287 documented comments were received as a result of solicitation by Federal Register notices, news releases, public meetings, and formal public hearings.

The December 15, 1978, issue of the Federal Register stated, "Written comments on the draft statement will be accepted on or before February 13, 1979, submitted to the Office of Coal Management (140), Bureau of Land Management, Department of the Interior, 18th and C Streets, N.W., Washington, D.C. 20240."

The congressionally mandated 45-day review period was extended by the Department to 60 days in order to allow those commmentors preparing their statements the maximum amount of time to respond to the DES.

All letters and testimony were reviewed by the environmental staff in the preparation of the final environmental statement. Letters received by the BLM were first reviewed relative to either draft corrections or issues raised. All substantive comments–those which presented new data, questioned analyses, or raised questions bearing directly upon the environmental effects of the proposed action and its alternatives–were responded to separately.

Every person who testified at the hearings and every letter postmarked no later than February 11, 1979, or received no later than February 13, 1979, were assigned an index number. (Section 8.3.7 lists all substantive comments and Departmental responses.)

The comment was presented verbatim whenever possible; each independent comment was identified by an index number. Comments which duplicated others were responded to by referencing the first response (index number). Once a comment or issue was responded to fully, the initial response was not repeated; the reader is referred to the initial response in answering all similar comments.

Such substantive comments were then analyzed for subsequent change or insertion into the text of this final environmental statement.

Letters which were general, vague, or did not contain substantive comments were reviewed, but no specific response was prepared. Comments of an editorial nature, if not substantive, were also not responded to, although appropriate text changes were made. The reader who wishes to identify comments and testimony by topic may refer to Section 8.3.7, and then to the appropriate list of hearings witness (Section 8.3.6) or comment authors (Section 8.3.5) to specifically identify appropriate comment/responses. All respondents who provided written comments and all of the persons appearing as hearing witnesses are listed in Section 8.3.8, for general reference.

8.3.5 Letters Received with Substantive Comments

Over 131 letters were received during the 60-day review period from environmental groups, interested citizens, industry, and Federal and state agencies. All letters were reviewed and considered. Below is a list of only those respondents who submitted substantive comments. Letters that were repetitive or did not address the adequacy of the DES were assigned an index number but are not listed below. (Refer to Section 8.3.8 for a listing of all commenters.)

Index Number	*Agency, Organization, or Individual*
001.	Southeast Nebraska Council of Governments
006.	Energy Transportation Systems, Inc.
010.	Intermountain Exploration Company
011.	Natural Resources Council (Iowa)
013.	Ray Brady
014.	North Dakota State Planning Division
017.	Wallace McMartin
018.	Sweetwater County Planning Department
019.	Western Coal Company
025.	Friends of the Earth, Inc.
026.	The Colorado Mountain Club
029.	Bruce Seegert
030.	Doris Ellis
031.	T.W. Thursby
032.	Edwina Eastman
034.	Wesco Resources, Inc.
035.	BLM (Utah State Director)
037.	Mrs. Arthur Beier
038.	Greg Flakers
042.	High Country Citizens Alliance
043.	M. Christopher
047.	Office of the Governor - State of Vermont
053.	Charles W. Margolf
055.	Council of Energy Resource Tribes
056.	Office of the Governor - State of Texas
057.	DNA - Peoples Legal Services, Inc.
058.	Public Lands Institute, Inc.
059.	Western Colorado Resource Council, Inc.
060.	Colorado Open Space Council
061.	Northern Plains Resource Council
062.	Powder River Basin Resource Council
066.	Coastal States Energy Company
067.	Burlington Northern
068.	Consolidation Coal Company
069.	Peabody Coal Company
071.	Environmental Information Center
073.	Northern Minerals Company
074.	CSG Exploration Company
075.	MONTCO
076.	League of Women Voters of the United States
077.	AMAX Coal Company
078.	Utah Power and Light Company
079.	Bureau of Mines
082.	Ad Hoc Committee on Public Body Leasing
083.	Mobil Oil Corporation
084.	Sunoco Energy Development Company
085.	The Rio Grande Chapter of the Sierra Club
086.	Katherine Moorehead
087.	American Mining Congress
088.	El Paso Natural Gas Company
089.	Natural Resources Defense Council, Inc.
090.	Duncan, Brown, Weinberg, and Palmer, P.C.
092.	The Carter Oil Company
093.	Office of the Governor - State of Utah

094. The Cherokee and Pittsburg Coal Mining Company
095. Southern California Edison Company
096. Tenneco Coal
097. Friends of the Earth
098. National Coal Association
099. Environmental Policy Institute
100. Peter Kiewit Sons, Inc.
101. Colowyo Coal Company
103. Council on Economic Priorities
104. James Catlin
105. Tri-County Ranchers Association
106. 3R Corporation
107. R Bar Ranch
108. Sierra Club - Northern Great Plains Office
109. The New Mexico Natural History Institute
110. James and Karen Bernhardt
111. The Illinois South Project, Inc.
112. Page T. Jenkins
113. Colorado River Board of California
116. United States Department of Agriculture (SCS)
118. Powder River Basin Resource Council
120. Colorado Westmoreland, Inc.
121. Office of the Governor - State of Montana
122. Office of the Governor - State of Wyoming
123. National Wildlife Federation
124. Environmental Defense Fund

8.3.6 Individuals Presenting Relevant Testimony at the Hearings

A toal of 360 persons attended the ten hearings with (74) witnesses presenting oral testimony. Individuals who did not make substative comments were assigned an index number but are not listed below.

128. Milton A. Oman
Self
130. Gordon Anderson
Friends of the Earth.
131. Gary Tomsic
Southeastern Utah Association of Governments, Economic Development District
134. Nina Dougherty
Sierra Club-Utah Chapter
135. George Byers
Western Coal Company
136. John Tilten
Environmental Affairs for Chaco Energy Company
137. Paul Robinson
Southwest Research
138. Joseph Gmuca
DNA People's Legal Services
139. Judson C. Kelly
Self
144. Sarah Gorin
Powder River Basin Resource Council
145. Bob Anderson
Powder River Basin Resource Council
146. Reed Zars
Powder River Basin Resource Council
147. Al Minier
Wyoming State Planning Coordinator
148. Bruce Hamilton
Sierra Club, Northern Great Plains Regional Representative.
150. Frederick Murray
MAPCO, Inc., Tulsa, Oklahoma
151. Ken Norris
Colorado-Ute Electric Association
152. Daniel R. Ellison
Sun Coal Company Inc.
154. Carolyn Ruth Johnson
Public Lands Institute
155. Harris Sherman
Colorado Department of Natural Resources
156. Kenen Markey
Friends of the Earth
157. Annee Vickery
Conservation Committee of the Colorado Mountain Club
158. Brad Klafehn
Colorado Open Space Council
159. Terry O'Connor
Peabody Coal Company
160. Steven Moore
Colorado Wilderness Network
161. Lynn Burns
Self
162. Jerry Whiting
Central Southwest Fuels, Inc.
163. Traver Berrington
Sierra Club
164. Linda Lindsey
Self
165. Steve Wolcott
Self
166. Robin Nicholoff
Self
167. Gretchen Nicholoff
Provisional League of Women Voters
168. Mark Welsh
Self
170. Governor Tom Judge
State of Montana
171. Jean Anderson
League of Women Voters

172. Bill Mackay
Northern Plains Resource Council
173. Harvey Bieber
McCone Agricultural Protection Organizations
714. Henen Waller
Self
175. Douglas Richardson
(for) Bertha Medicine Bow, Northern Cheyene Resource Project
176. Mary Daniels
Tri-County Ranchers Association
178. Dr. Daniel Henning
International Council of Environmental Law
179. Keith Williams
Montana Water Development Association of Billings, Montana
182. Ruben Hummel
Self
184. Dwight Connor
Office of the Governor, State of North Dakota
185. Evelyn Newton
Self
187. Ted Nace
Self
188. Randolph Nodland
Self
189. June Thompson
North Dakota-South Dakota Sierra Club
191. Carey Ridder
Environmental Policy Institute
192. Lamont C. Laue
Sunoco Energy Development Company
193. David Masselli
Friends of the Earth.
194. Kevin L. Markey
Friends of the Earth.
195. Jonathan Lash
Natural Resources Defense Council, Inc.
197. Daniel J. Snyder, III
Colorado Westmoreland, Inc.
198. Roger E. Nelson
Utah International, Inc.
200. Nancy Strong
Self
202. Susan Westfall
Self

8.3.7 Substantive Comments and Departmental Responses

During the extended public comment period, a total of 287 written comments (including witnesses testimony) were received and recorded.

Each letter received and each person who testified at the hearing was assigned an index number. In the following part of this chapter, substantive comments received are grouped by seperate categories (e.g., Background, Reserves Estimates, etc.). The comment was typed verbatim in most cases; these comments are followed by the index number of the agency, organization or person who made the comment. Similar comments received from more than one source have several index numbers identifying the source. An appropriate Departmental response either identifies that the text of the ES was changed or provides rationale for why the comment did not require a text change. Those comments solely editorial in nature were incorporated within the text of of the final ES but were not repeated or responded to in this chapter.

Category

- Background
- Reserves Estimates
- Mine Size and Production
- DOE Model
- Supply and Demand
- Regional Boundaries
- Alternate Energy Source
- East v. West
- Existing Leases
- Need for New Leasing
- Delegent Development
- Bonus Bid
- Strip Mining Rules
- Preferred Program
- Alternatives
- Land Use Planning
- Unsuitability Criteria
- Production Targets
- Competitive Bidding
- Industry Nominations
- Public Participation
- Special Leasing Considerations
- Start Up Consideration
- Surface Owner Consent
- Post Programmatic ES Strategy
- Maximum Economic Recovery

- End Use Considerations
- Environmental Description
- Impact Assessment Methodology
- Reclamation
- Environmental Analysis
- Sub Alternatives
- Mitigation
- Long Term Impacts
- Intra-Agency Cooperation
- General Comments
- Appendices

Comments and Responses

BACKGROUND

1. **Comment.** "In many cases, the DOI may not even be aware a coal resource exists. According to Section 1.3.1 of the Draft Statement, almost half of the federal coal leases issued in the past have required no competitive bidding; indicating that almost half the areas of interest to private industry were not known by the government to have significant coal resources prior to leasing. Under the preferred program, such lands would not be leased. A pragmatic program must receive the input of industry to determine which lands should be open for leasing and to encourage evaluation of potential coal properties."

Commenters 066, 083, and 192

Response. As stated in Chapter 2, prior to 1976, the Department could grant coal prospecting permits for lands that needed additional exploration and if the company that had the permit found an economically attractive deposit, and showed the Department, it could receive a lease. Congress repealed this authority in 1976 as unnecessary and contrary to its view that coal should be disposed of only for fair-market value. About half of all leases were granted under this now repealed procedure. This does not mean that the government did not know about these deposits before the prospecting permit or lease was issued. The discovery and delineation of commercial coal deposits has been a cooperative effort by industry and government. Partially as a result of the legal structure that existed until 1976, the Department often made the initial identification of potential coal deposits, what are now commonly referred to as coal resources, through mapping programs, surveying, and other governmental functions. Intentionally, however, the role of the government stopped there, and industry had the role to do the additional work to further identify which resources were capable of being mined; that is, to identify reserves. Congress has now subtly changed this relationship by giving the Interior Department greater responsibility to identify coal reserves. This does not mean that industry's role is no longer needed or wanted. The reverse is true. Even under the revised statutory provisions, industry must participate heavily in a coal program if it is to be a success. This is true both with respect to working with the resource managers in the land-use planning process and to continuing drilling and exploration efforts. The Congress specifically authorized the Department to grant exploration licenses to give companies the right to explore for coal. These exploration licenses do not give a company any right to a lease, but they do provide the opportunity to the company to obtain the information it needs to decide whether or not to bid to acquire a new lease.

2. **Comment.** "The second background issue concerns the analysis of the federal laws now in effect which are designed to minimize environmental damage resulting from various aspects of federal coal development. These laws are summarized at section 1.3.1 of the DEIS. A further analysis of the impact of these laws on coal development would be valuable in evaluating the impact of the preferred program and alternatives for federal coal development.

"Historically, severe abuse of natural resources has occurred in surface mining of coal. These are still visible, particularly in the Appalachian region. However, these abuses can no longer occur in large part because of the passage of the Surface Mining Control and Reclamation Act of 1977. An in depth analysis of federal laws governing coal development will impart to the reader of the FEIS an understanding that the limitations on development which appear in the preferred program, or whatever alternative is chosen, are not the only regulations in existence. The program must be viewed not as the last barrier to mindless coal development, but rather as one part of a multi-faceted federal system which will permit rational utilization of federal coal assets."

Commenters 019, 069, 090, and 135.

Response. The Department hopes that its presentation of material in this statement shows that the Federal coal leasing program is only one

of many elements that affect coal development and that, independently of any actions taken here, other programs and laws ensure a high degree of resource protection. Particularly with the contemporaneous in-depth analysis of SMCRA now underway, we do not think additional in-depth analysis of all applicable laws is needed here; presenting the principle that many ways exist to protect the environment is more important to forming a national coal management program than would a recital of the details of these laws.

3. **Comment.** "Section 1.1.2 also describes the various alternatives briefly and reveals vividly in its summation of the preferred alternative that offering tracts for leasing would be the last alternative after all other land use options have been exhausted. It is felt that this was not the intent of either the Congress or the Administration in placing emphasis on rapidly increased development of coal in the Nation which the Statement acknowledges must, to some significant degree, be based on new federal leasing. If it is the opinion of the Department that some legislation demands the assignment of the lowest priority to coal leasing then it would be necessary in explaining the preferred alternative to provide a detailed discussion of that legislation. Furthermore, it would be most enlightening to have a discussion of what, if any, legislative authority there is for putting such uses as the establishment of recreational areas above that of coal leasing."

Commenters 066 and 071

Response. The summary description of the proposed program and the fuller description of the program in Chapter 3 and the example regulations do not, in our opinion, make coal a last alternative. The program does make a strong attempt to identify lands which statutes or executive orders have put off-limits to coal development as early as possible in the process. It also strives to set up a system that minimizes loss of existing surface resources. If expensive recreational facilities have been built at a site, it makes little sense to develop coal there if nearby lands that have similar or better coal can be found. Otherwise, the coal company would have to bear the needless expense of other rebuilding or relocating the recreational site. Common sense is the only authority needed for actions of this type. Coal development will invariably have to displace other uses - grazing, wildlife, recreation, timber or the like; it is not a last alternative. The Department does believe, that it can afford to attempt to plan the uses of its land to encourage coal development to take place so as to minimize costs to other users of public lands. Statutory citations for the emphasis on land use planning are provided in the statement. In response to this and other comments, a more complete discussion of the role of and procedures for land use planning is given in Chapter 3 of this final statement.

The comment on NEP goals will be responded to in the comments on Chapter 3.

4. **Comment.** "Section 1.1.4 suggest that, although the Department will complete ongoing regional environmental impact statements, it contemplates the preparation of at least an environmental analysis for each and every coal lease and mining plan which would probably result in the initiation of a full environmental impact statement for most such leases and plans as well as new regional impact statements and revision and updating of the programmatic impact statement. Such a procedure again requires unnecessary delays. As is evident from Figure 1-2, most of the major areas where coal mining is planned or can be expected to occur in the West are currently covered by a regional environmental impact statement that has either been completed or is in some stage of preparation. Even with significant new leasing in any particular region, much of the information that has already been presented or has been collected for ongoing regional impact statements can be used for any new additional leasing in the area. This information includes general topics such as climatic conditions, reclamation characteristics and certain socio-economic considerations. It is urged that the Department make it clear in the final programmatic statement that wherever possible, such information will be incorporated by reference and that ongoing regional impact statements will be only supplemented or updated where new leasing is provided, in order to minimize delay."

Commenters 066 and 071

Response. The Department's proposed program uses larger "regions" than did the environmental statements started by the Department in 1976. The principal reason for the change is to give the Department a better opportunity to analyze

regional impacts and to mitigate possible adverse social or economic effects. The Department has not finally decided the exact format of the regional statements, but certainly the alternative of incorporating material by reference from the existing statements is under consideration as is doing entirely new statements. In either event, the Department will use, wherever possible, the information it has previously developed in the existing regional statements.

5. **Comment.** "In the second paragraph of Section 1.3.1.3, reference is made to the fact that SMCRA gives the Office of Surface Mining little discretion in enforcing the provisions of that Act. Such a statement would certainly come as a surprise to the drafters of final regulations for that Office and the critics of those regulations which are being hotly debated at this time. It would seem that the Office of Surface Mining has somehow developed the attitude that the Act gives them a lot more discretion in formulating regulations and implementing the various provisions of the Act than the drafters of this Statement and other agencies of the Department of the Interior recognize. It might very well avoid a lot of extensive litigation if the Department would, from the higher levels of the Department, work directly with the Office of Surface Mining to assure that the regulations which it develops are indeed within the tight authorization granted to the Office by SMCRA."

Commenter 066

Response. The word "overall" has been added before "design" to clarify that the SMCRA does not give OSM the authority to drop whole standards or objectives. In individual areas, OSM does have considerable authority to interpret Congress's intent. The introductory background description of statutory authority here, as elsewhere in Chapter 1, cannot be construed in any way to be a substantive comment or the mandate of the law. Certainly, for SMCRA, the more authoritative document is the final environmental impact statement on the permanent regulations prepared by the office established under SMCRA to administer the Act – the Office of Surface Mining Reclamation and Enforcement.

6. **Comment.** "P. 1-4, Figure 1-1. A large scale map, or several maps, would help the public to properly evaluate the location of the coal supply region."

Commenter 025

Response. The map has been altered but it is not practical to print it at a larger size. For more detail on the specific counties involved within a given region refer to Appendix H, Table H-6 and Appendix J. Section 3420. 3-1 of the proposed regulations sets out a method for changing regional boundaries should the need for such a change become evident.

7. **Comment.** "P. 1-11, Table 1-4. The mining method shown for the Delta, Colorado lease is incorrect. It should read "underground."

Commenter 025

Response. The FES contains this correction.

8. **Comment.** "Figures 1-2. The Northwest Colorado study boundary is not adjacent to the West-Central Colorado ES boundary as shown."

Commenter 025

Response. The boundaries of Figure 1-2 have been corrected for the FES.

9. **Comment.** "Figure 1-2. The boundary of the Star Lake-Bisti region is incorrect."

Commenter 019

Response. The boundaries of Figure 1-2 have revised, where appropriate, for the FES.

10. **Comment.** "Table 1-1 (page 1-6) lists only one site-specific mining and reclamation plan. Two DEIS's already have been issued (Nerco and Peabody) for the Powder Regional EIS."

Commenter 071

Response. The FES contains the suggested modification.

11. **Comment.** "The functions shown for the Forest Service in Table 1-7 should be broadened and rearranged, as follows, to more nearly reflect a balance of programs:

—land and resource management planning necessary for the administration of National Forest System lands and the management of renewable natural resources;

—the development of lease stipulations and the exercise of consent authority in lease issuances and mining and reclamation plan approvals;

—the issuance of easements and permits for ancillary facilities off the lease area;

—the administration of an abandoned mined land reclamation program."

Commenter 282

Response. The FES contains the suggested modification.

12. **Comment.** "The purpose and major relevance columns of Table 1-5 should be reworded to reflect the primary impact of the National Forest Management Act of 1976, as related to coal mining:

Purpose: Provides for a comprehensive system of land and resource management planning for National Forest System lands.

Major Relevance: Key factor in the Secretary of the Interior's determination of where coal leasing will occur."

Commenter 282

Response. The FES contains the suggested modification.

13. **Comment.** "The major relevance column of Table 1-5 should be reworded for the Multiple Use-Sustained Yield Act of 1960 to align it with FLPMA:

Major Relevance: Mandates land management principles similar to those required of the Department of the Interior under FLPMA."

Commenter 282

Response. The FES contains the suggested modification.

14. **Comment.** "(Page 1-11) In Table 1-4 (Leases Issued Between 1974 and 1978), with respect to 1978 CO-Delta, the type of mining should be underground (not surface)."

Commenter 091

Response. Agreed. The FES contains the corrected information.

15. **Comment.** "(Page 1-14) A production rate of 96 million tons for 1977 is given for mines on or related to Federal leases. The basis for this production rate should be given so that appropriate comparisons with proposed production increases can be made (e.g., comparison with Table 2-2)."

Commenter 091

Response. The basis for the 96 million ton figure is the production records of the Department. Table 2-2 is the demonstrated coal reserve basis for the United States. There is very little to compare between the table and the production figure.

16. **Comment.** "The rationale used for redefining the 12 coal Regions to cause the preparation of new coal ES's is not clear (pages 1-4, 1-5 DES)."

Commenter 282

Response. This is more thoroughly discussed in chapter 2 and the response to comments in that chapter.

17. **Comment.** "p. 1-21 P.L. 94-429 should be included in the list of pp. 1-17 to 1-21. Sec. 9 of this law requires a determination whether any *natural landmark* is threatened or being destroyed by any surface mining activity. The major relevance is recognition and protection of nationally significant natural areas as they relate to surface mining."

Commenter 233

Response. The table has been modified to include a citation to this law (Act of September 28,1976, Public Law 94-429, 90 Stat 1342, 16 U.S.C. 1908).

18. **Comment.** "We know the leasing strategies preferred by the Department will all rely on the surface management agencies' planning systems to identify areas suitable for coal leasing; this can be done by June 1, 1979.

We would like to use the period of September 1978 through March 1979 to review and revise *the areas planned for coal only* in selected recently completed MFP's on high potential coal deposits, to insure that these plans are consistent with current Departmental policy and ready for use in developing the mid-1980 coal lease offer options. Doing this will involve the following steps, to be completed by March 1979.

Instruction Memorandum No. 78-381, July 19, 1978 (emphasis in original).

The process described in Instruction Memorandum 78-381 constitutes implementation of the "preferred alternative," and it is not a part of a general and comprehensive land use planning process. It is solely and specifically designed to prepare for a mid-1980 coal lease sale. IM 78-381 does not order consideration of coal resources in the context of resource management activities. It explicitly cautions the State Directors "to review and revise the areas planned for coal only ...."

Commenter 089

Response. The process described in I.M. 78-381 does not implement any leasing program, and is part and parcel of the planning system. As a subsequent instruction memorandum makes total-

ly clear, the review referred to here is to carry out land-use planning duties, to further test unsuitability criteria and to begin the Federal Lands review, 43 Federal Register 57662-64: I.M.-79-76.

19. **Comment.**

"II. NRDC vs. HUGHES"

"Under the U.S. Constitution and the Separation of Powers Doctrine, it is improper and inappropriate, if not unconstitutional, for the Executive Branch (Department of the Interior) to permit the Judicial Branch (Judge Pratt) to require the Executive Branch to address the question of the 'need for leasing'.

(a) The Executive Branch, by a number of Acts of the Legislative Branch, has been granted both the authority and the responsibility to manage the lands and mineral resources owned by the United States of America.

(b) Leasing of federal coal is the statutory responsibility of Interior. The determination of the need to lease is both a statutory and proper responsibility of Interior as the agency designated to manage coal owned by the United States.

(c) The determination of the need to lease, when, and in what quantities, are determinations that cannot constitutionally be delegated to the Judicial Branch. Nor can the Executive Branch *properly* submit even to inquiry by the Judicial Branch as to the determination of "need", let alone feel it necessary to justify such determination to a Federal judge as a prerequisite to preparing a leasing program.

(d) Judge Pratt acted improperly, if not unconstitutionally, in requiring Interior to demonstrate to him the "need for further leasing". Interior acted improperly, if not unconstitutionally, in recognizing any authority on the part of the Judicial Branch (Judge Pratt) to require a showing of "need".

If an administrative agency, in carrying out its statutory responsibilities, acts "arbitrarily and capriciously" that is one thing. When that is alleged, the burden rests on the plaintiff to show by convincing evidence that such is the case. That was not the issue in *NRDC vs. Hughes.*

In short, it is no business of the Judicial Branch to inquire into, let alone sit in judgment on, the "need for leasing". The authority, the responsibility, and the duty to determine the "need for leasing" reposes upon the Executive Branch *alone.* So long as the Executive Branch, in making its determinations, does not act arbitrarily and capriciously it is simply no business of the Judicial Branch.

How the Executive Branch exercises its management authority and discharges its management responsibilities is, of course, another matter."

Commenter 053

Response. This comment does not involve the substance of either the environmental statement or the program. It has been sent to the solicitor's office for appropriate action.

20. **Comment.** "Memoranda written by the Director of the Bureau of Land Management (BLM) and the Directors of the Western Coal State Offices of the BLM reveal a strenuous and systematic program to prepare for for a mid-1980 lease sale. The program, directed specifically toward the identification of forty lease tracts in time for the 1980 sale, requires updating of MFPs prepared for coal management under EMARS II and the Application of the draft Lands Unsuitability Criteria. The 700,000 acres of land to be reviewed as part of this program have not been selected pursuant to comprehensive resource planning. There has been no intraregional evaluation of competing values. The criterion by which the selection was made was simple. "Focus on planning areas where completed MFP'S delineate areas potentially suitable for coal leasing to meet short-term (1980) leasing goals."

Commenter: 089

Response. Secretary Andrus has personally stated that no decision as to whether to adopt a leasing program and whether to resume leasing will be made until after this statement is completed. We regard the steps that have been taken so far to be in rigid compliance with both the spirit and letter of the *Hughes* order. The ongoing activity is needed to ensure that any program, if adopted, will be one that is based on sound data and standards.

21. **Comment.** "The issue in NRDC v. Hughes was the adequacy of the final Environmental Impact Statement prepared on the Energy Minerals Activities Recommendation System (EMARS

II). The Court concluded that the EIS was inadequate. It found both the explanation of EMARS II and the consideration of alternatives to be insufficient. The court specifically referred to the necessity that the Department consider the need for any leasing at all, and ordered the Department to prepare a new draft impact statement and the Secretary of the Interior to personally reevaluate federal coal leasing policy, based on information contained in the new final EIS, and to make a new decision as to whether a new leasing program shall be instituted and, if so, what kind of program it should be.

"Natural Resources Defense Council v. Hughes, supra, 437 F.Supp. at 994 (emphasis added).

Until that task is complete, the Department is enjoined from taking "any steps whatsoever, directly or indirectly, to implement the new coal leasing program ...." 437 F.Supp. at 993.

"The Department has apparently concluded that the provision of the Court's order, as modified, which permits the 'preparation of comprehensive land use plans,' 454 F.Supp. at 152, forbids only implementation of EMARS II and the identification or leasing of tracts. 43 Fed. Reg. 57663 (December 8, 1978); Memorandum for the Deputy Solicitor to the Director of the Bureau of Land Management 'Planning and Data Collection Efforts Under NRDC v. Hughes,' at 1–2. Such a conclusion is incredible in the context of the decision of the court. The order of the court explicitly bars implementation of 'the new' (emphasis supplied) coal leasing program; the point of the order is to compel the Department to properly complete the EIS process before it adopts, let alone implements, a new program.

"The language which permits land use planning to go forward is addressed to comprehensive planning which incidentally involves consideration of coal. Yet the Department has instituted planning activities directed only to the leasing of coal.

We regard the Department's violation of the court's order as so complete as to render the Programmatic Impact Statement functionally irrelevant. The Department's memoranda and actions suggest that the decision to lease and to lease soon was made before the basic tasks imposed by the court were even addressed. The Impact Statement will inevitably turn into an effort to justify that decision rather than a means to inform the decisionmaker."

Commenter 089

Response. The original order in *NRDC v. Hughes* contained only very general language on what activities could occur until a new environmental statement was filed and the Secretary decided whether to adopt a new program. It only said: that federal defendants, their agents and employees, and all those in concert or participation with them are enjoined from taking any steps whatsoever, directly or indirectly, to implement the new coal leasing program.

The Department was concerned that the order might be construed overbroadly. On February 25, 1978, the plaintiffs and Federal defendants in *NRDC v. Hughes* agreed that "Federal defendant's activities respecting federal coal are of such a complex and diverse nature that the scope of the general language of the court's order is subject to honest dispute." In an attempt to clarify and modify the original order, the following language was added to the original order:

Federal defendants are not enjoined from engaging in any general studies or from preparing any general analyses or environmental impact statements with regard to federal coal leasing on either a national or regional basis. Federal defendants may prepare comprehensive land use plans as long as they do not recommend the leasing of any tracts of coal: however, the plans can consider present and potential uses of public lands.

The Department's view of the import of the modified court order was clearly stated in a memorandum signed by the Deputy Solicitor on May 24, 1978, three weeks before the court approved the proposed stipulation. The memorandum says:

Although land use planning was an integral part of EMARS, and a "comprehensive land use plan" is required by section 3 of the Federal Coal Leasing Amendments Act of 1975, 30 U.S.C. §201(a)(3)(A)(i), before a lease sale is held, land use planning is also mandated wholly outside the context of the coal program by section 202 of the Federal Land Policy and Management Act, 43 U.S.C. §1712. The potential application of Judge Pratt's Order to land use planning was one of the subjects that led us to stipulate with plaintiffs in Hughes "that the scope of the general language of the Court's Order is subject to honest dispute."

Even though the revised court order has not yet been approved by the District Court, this language can be used to guide data collection and land use planning efforts.

In our view, the gathering of raw data is in no way circumscribed, whether in the form of Unit Resource Analyses, contract studies, or Geological Survey mapping of federal coal resources, including drilling and core sampling. Further, the collation and analysis of such data is in no way circumscribed.

The only proscription deals with the recommendations, or proposals for action contained in a land use plan as they relate to coal and actions in furtherance of the recommendations or proposals. BLM, with the help of GS and OSM, as appropriate, is free to evaluate coal resources and other resource values to determine if lands are *suitable* for coal development or not, and it is free to designate lands as unsuitable for surface coal mining under section 522 of the Surface Mining Control and Reclamation Act, 30 U.S.C §1272. BLM may make recommendations or "decisions" *not* to lease or to mine coal in its land use plans.

BLM is prohibited only from recommending or proposing to lease a tract otherwise found suitable for coal development, or from taking action that directly implements such a recommendation or proposal.

Similarly, on June 28, 1978, the Deputy Solicitor advised the Director, Geological Survey, that "work designed to determine the suitability or unsuitability of public land for coal development is in no way circumscribed. The unsuitability tests now being done are being done (1) as part of a land-use planning process and (2) focusing on potential coal development areas rather than tracts. It is clearly within the scope at the F1 Hughes order."

RESERVES ESTIMATES

1. **Comment.** "Table 2–29 was made using data from BLM District Offices which has in many cases changed drastically."

Commenter 019

Response. Table 2–29 was based on a survey by the Geological Survey and data from DOE, not the BLM. The figure of 8.5 million tons was the best estimate by the Geological Survey mining supervisor as of March 1978.

2. **Comment.** "The DOI may also underestimate likely production. A persistent self-fulfilling prophesy that deep reserves will not be developed in the West eliminates from consideration PRLA's and the use of deep reserves in the private sector."

Commenters 097, 156, and 174

Response. Western prospects for deep mining are poor, except in certain areas, because of the large reserves of surface mineable coal and its relatively much lower mining cost. Environmental considerations could favor underground mining in particular circumstances.

3. **Comment.** "Adding only production from deep PRLA reserves to 1990 likely and probable production allows us to meet all western-wide production projections except the 1990 high projection."

Commenters 097 and 156

Response. If these leases were granted quickly and if production occurred in proportion to reverse size, the comment would be correct. Because of high production costs, PRLA underground reserves are unlikely to be in production by 1990 except in the Uinta-Southwestern Utah Coal Region and in some special circumstances. The largest amount of PRLA underground reserves are in the Powder River Coal Region where very little or no underground mining is expected. It is possible that reserves of this type will not meet the commercial quantities test and no lease will be issued.

4. **Comment.** "Table 2-4. Total surface-mineable reserves in the San Juan Basin are approximately 6 billion tons, according to the New Mexico Bureau of Mines. Yet this table states that 4 billion tons alone are on Indian lands. This figure is very questionable."

Commenter 019

Response. The estimate for Indian lands was provided by the Bureau of Indian Affairs. It reflects a less restrictive standard for inclusion of reserves than employed by the Bureau of Mines and, thus, probably counts some reserves that the Bureau of Mines would consider too speculative to include, until further delineation. See new discussion in Section 2.7.2.

5. **Comment.** "Table 2-23. How were these PRLA reserves estimated?"

Commenters 019 and 097

Response. A BLM task force report on PRLAs, entitled "An evaluation of Coal Preference Right Lease Applications," explains this methodology and can be obtained on request.

6. **Comment.** "No coal is recoverable today until it is known that the coal is legally available to mine and legally mineable and that cannot be known until all required permits are in hand."

Commenter 053

Response. The currently accepted definition of recoverable reserves does not require that all permits be in hand before counting such reserves.

7. **Comment.** "In Table 2-19, why are recoverable reserves of existing federal leases for Montana confidential?"

Commenter 071

Response. Current policy is to hold reserve information on individual leases confidential and not to disclose reserve information for groups of less than 32 lessees. Where two or more leases have the same owner, or where one lease has an unusually large share of the coal, the Department may also hold data confidential for groups of more than three leases. The Fort Union region in Montana has only 3 leases and its data is held confidential. Montana lease reserves in the Powder River Basin are in fact shown in table 2-19, but because of an insufficiency of underground lease reserves, the breakout between surface and underground reserves is held confidential.

8. **Comment.** "The statement that 45% of the nation's reserves on a BTU basis is found in the West is in direct contradiction to the findings of the National Coal Policy Project which reports that '70 percent of the remaining coal in the United States - in terms of energy value - lies east of the Mississippi River."

Commenter 118

Response. The 45 percent figure is based on the distribution of coal by weight and a Bureau of Mines estimate of average eastern BTU content of 12,500 BTU's per pound and western Btu content of 9,000 BTUs. Given the distribution of reserves by weight, if western coal is assumed to average 9,000 Btu's per pound, eastern coal would have to average more than 20,000 Btu's per pound to consitute 70 percent of coal energy. This Btu content far exceeds actual eastern Btu content. Hence, the figure of 70 percent given by the national Coal Project appears to be a large overestimate of eastern coal's share by energy value.

MINE SIZE & PRODUCTION

1. **Comment.** "Mr. Freudenthal stated that the 2,560 acres listed in Table 2-27 and paragraph 2.7.3 is used as the minimum acreage of nonfederal coal in a continuous block that could be developed. Yet the smallest mine plan in the San Juan Basin is 6,095 acres."

Commenter 019

Response. Any acreage selected for a standard mine size would be somewhat arbitrary. The figure of 2,560 acres was selected to be most representative of western coal mine sizes. With a 10 foot seam, 2,560 acres would support a 1 million ton per year mine for 30 years. This acreage provides a conservative estimate of the inhibitions that would be placed on development of nonfederal coal by a lack of leasing. The standard acreage adopted depends on the mine size assumed, which can vary considerably within regions as well as among regions. If the higher figure were adopted, the relative importance of federal coal in mixed mineral ownership areas would increase.

2. **Comment.** "Likely production from existing leases without mine plans in the Powder River Basin in 1985 is stated to be 7M tons. Our investigations indicated 27.2M is a lot closer."

Commenters 097 and 118

Response. The Department does not want to generate a debate with individual companies concerning predictions on the production likelihoods of their individual leases. The estimates for likely production from leases without mine plans were made by GS mining supervisors, taking into account lease size, environmental, transportation, coal type and other factors. It is likely that the actual production will fit into a reasonable range above or below the estimate depending on changes in markets.

3. **Comment.** "One of the more serious difficulties in the chapter 2 concerns the estimates of time required to bring a lease into full production (2.8.1, page 2-43)."

Commenter 069

Response. Full production may require more than 7 years in some cases but, if the demand exists, 7 years should normally be adequate.

Several companies have suggested to us in the context of this statement and in public information on proposed openings of new mines that seven years is too lengthy a projection and that it could and should be halved.

4. **Comment.** "In section 2.8.2 of the DEIS reference is made to the fact that a decision not to lease federal coal could result in a shortfall of coal in the overall national energy picture."

Commenter 090

Response. It is difficult to predict the precise impacts of a shortfall in national coal production due to no Federal leasing although the no new leasing alternative tries to do so. Depending on the total demand for energy, the major impact would be expanded imports of foreign oil, however added gas production and increased nuclear production could also result in higher energy costs, but little change in the overall fuel mix.

5. **Comment.** "Will the final EIS reconsider the aggregate coal production targets in terms of recent developments which mitigate the probable demand for coal—i.e., Mexican gas, Canadian gas availability, loosened Canadian crude restrictions, Alaskan gas, etc.?"

Commenters 090 and 121

Response. The developments noted that would tend to reduce coal production requirements are to some extent offset by even more recent increases in the instability of Middle Eastern oil supplies. If Middle Eastern oil production were significantly reduced or international oil prices were to rise substantially, the pressures for greater coal development would be heightened. All these recent developments — both increasing and decreasing potential coal needs — illustrate the great uncertainty of long range coal projections. The final EIS does not contain revised projections because the low-medium-high range of production levels still encompasses any likely future production levels. A long-term decision on whether to establish a Federal coal management program cannot be based on almost month to month shifts in coal prospects. The decision whether to lease once a program is adopted can take these concerns into account.

6. **Comment.** "Without back-up data, the assigned likely production figures for existing leases without mine plans raise some interesting questions. Nearly 95% of the reserves under lease in the Powder River Basin are assessed not to be developed. Does GS have different views on the potential demand for PRBR coal than DOE."

Commenters 097, 108, and 118

Response. Assessing the true development prospects of a lease for which there is no mine plan requires an inherently subjective estimate. There is no substitute for good judgment, and no elaborate formulas or mechanical procedures would be likely to improve on good judgment. GS mining supervisors are closely involved with Federal leases and mining circumstances generally in their areas and are in a position to make such judgments. Sixty-six percent of the existing Fderal lease reserves in the Powder River are expected to be in production by 1986. However, the great majority of these reserves are already in approved or pending mine plans. Reserves not expected to be producing are of lower quality and located in some cases off the prime Wyodak seam which has the highest development prospects.

7. **Comment.** "States should have a role in evaluating the inherent reasonableness of the targets based on available market information and forecasts."

Commenter 121

Response. States will be given the opportunity to comment on and participate in the regional production goal and leasing target setting process indirectly through consultation but, more importantly (if the preferred program is established), directly through their representation on the regional coal teams which have formal advisory authority to the secretary in the goal and target setting process.

8. **Comment.** "In Chapter 2 DOI apparently calculated its planned production estimates in the Powder River for 1985 in terms of what it believes will actually be produced. This results in a smaller production capacity for existing and newly approved mines."

Commenters 097, 108, 118, and 121

Response. Planned production estimates were based largely on the stated plans of individual coal companies. It is possible that actual production might be larger but this would be hard to predict.

9. **Comment.** "The Draft ES tackles non-Federal, non-Indian coal by estimating 1985 production at

35.7 million tons. Doubts over these figures increase when it becomes obvious from checking through the multitude of charts, that this represents a significant *decrease* in non-Federal, non-Indian coal production."

Commenters 097 and 108

Response. The comment is mistaken in assuming that 35.7 million tons represent all non-Federal coal production in 1985. The bulk of non-Federal, non-Indian coal production will occur in mines that include both Federal and non-Federal coal. This production was summarized in Section 2.7.1.1. The planned production described in the comment includes only mines that have no Federal coal at all and, thus, no Federal mine plan is involved. The stated drop in non-Federal production thus results from a mistaken comparison of all non-Federal production in 1977 (including mixed Federal-non-Federal mines) with 1985 production from the much more limited number of mines that have only non-Federal coal.

10. **Comment.** "(Page 2-1) Column 2, paragraph 3 states that the Federal Government owns essentially no coal within the Northern and Central Appalachian, Eastern Interior and Texas Coal regions. The State of Kentucky is an exception to this statement that should be taken into account. There are considerable Forest Service acquired lands in Kentucky."

Commenter 091

Response. This has been changed to indicate some Forest Service reserves in the East.

11. **Comment.** "(Page 2-29) Table 2-18 gives consumption patterns for Western coal. The DES should provide a detailed discussion of the basis for this table."

Commenter 091

Response. A detailed table supplementing Table 2-18 has been added to the text.

12. **Comment.** "(Page 2-32) For later comparison purposes, what is the breakdown by coal region for 1977 production from mines located on Federal leases?"

Commenter 091

Response. A column to that effect has been added to Table 2-20.

13. **Comment.** "(Page 2-30) With regard to the application of diligent development requirements to leases existing prior to 1976, the DES states that "the Department at present expects that the great majority, if not all, of such existing leases would be cancelled if they are not producing by 1986." Because application of diligent development requirements has a significant bearing on the need for additional leasing to meet projected 1990 coal production needs, the text of the DES should specifically address under what conditions such requirement might not be applied (i.e., a discussion in the text as opposed to purely a statement in the Example Regulations in the Appendices)."

Commenter 091

Response. This discussion has been added in Chapter 3 and Appendix I.

DOE MODEL

1. **Comment.** "The DES probably is not accurate in estimating the impact of the preferred program due to uncertainties in both demand and supply estimates on the part of the government."

Commenters 042, 071, 087, 089, 156, 168, 178, and 193

Response. The Department prepared its estimates of the future coal demand and supply for the FES in such a way as to bracket all probable levels of these functions for 1985 and 1990. There is, indeed, much uncertainty about the future levels of these figures, but we believe by choosing the broad range of figures that we have in the ES, e.g., 1990 level production ranging from 1,091 to 1,921 million tons, we have provided for prudent lowering of all levels of impacts.

2. **Comment.** "The DOE projections assume that electricity demand will grow from 1977 to 1985 at the rates of 4.4% per year in the low case, 4.8% per year in the medium case and 5.8% per year in the high case. The level of population growth, estimates of future cost of electricity, and amount of conservation, are not specified, making it difficult to perform a detailed analysis of the projections."

Commenters 019, 038, 042, 061, 062, 067, 071, 079, 087, 089, 097, 099, 130, and 187

Response. From 1969 to 1973, production of electric power grew at the average annual rate of 7.1 percent. Following the OPEC shock, it grew negligibly in 1974 at 0.2 percent, a little higher at 2.6 percent in 1975, went back up to 6.3 percent in 1976 and then declined to 4.6 percent in 1977 and 3.7 percent in 1978. Thus, electric power demand has behaved erratically in recent years and will be

difficult to predict for the future. The average growth rate for the past three years has been 4.9 percent, slighty above the medium assumption to 1985 of 4.8 percent. Future demand will depend on uncertain questions such as whether abundant conservation opportunities remain or whether the easier and cheaper conservation opportunities have already been exhausted. There is also an important question of whether rising oil and gas prices might not cause a shift to greater use of electricity as a substitute energy source for industrial and residential use. The underlying electricity growth rate assumptions generally reflect the assumptions employed in the PIES model by DOE.

3. **Comment.** "The Department of Interior's claim that it is not basing its assessment of the need for new coal leasing on the DOE production projections is not credible."

Commenters 089, 156, 079, 066, and 281

Response. DOE production projections play an important role in assessing the need for leasing. However, there are a number of other possible reasons for leasing that do not involve the DOE production projections. These include improving coal development patterns and creating greater coal industry competition. Long lead times require that coal be leased a number of years in advance of the date production is expected to begin. See the proposed regulations and Chapters 2 and 3 for further discussion of these reasons.

4. **Comment.** "The draft statement does not consider the impact of the preferred program upon demand for coal."

Commenters 089 and 019

Response. An increase in coal supplies driving down coal prices can be seen as a successful establishment of a competitive coal market. Coal companies will not produce below costs for long. The interaction between federal leasing and other energy prices would require a complete general equilibrium model of national energy markets. Such an effort is well beyond the requirements of this EIS. An analysis has been made of the impact of the preferred program on coal prices and a brief summary has been added to Section 2.8.1.

5. **Comment.** "The low crude oil price estimate should be increased and the 5.8 per cent NERC electric growth rate projection is practically useless.

Commenters 156, 038, 097, 099 and 104

Response. Future oil prices are almost impossible to predict with any certainty. A wide range of assumptions are thus needed. New gas price assumptions will be incorporated in succeeding model runs. It is on those succeeding model runs that the need for leasing would be continually reassessed under the preferred program and several other alternatives. The high electricity growth rate assumption is in line with long run historical experience, not unreasonable for a high assumption. From 1972, the average annual electricity growth rate was 7.2 percent. As recently as 1976, it was 6.3 percent. The electric utility industry is currently projecting 5.0 percent growth in 1985 as most likely.

6. **Comment.** "We are confused as to how (DOE) and DOI will resolve their projection differences and to whom the states will appeal if we are dissatisfied."

Commenters 155, 130, 170, 172, 187, 019, 079, 071, 089, 061, 062, 067, 097 and 066.

Response. The process for setting regional production goals is fully set out in the example regulations (see Appendix A, Section 3420.2). States will participate directly in this process and are assured access to the Secretary of the Interior before he makes his decisions on regional goals and targets. Comments on the regional goals (projections) will be taken at least twice before the Secretary makes his final decisions.

7. **Comment.** "The design and assumptions for the national coal model or NCM overestimate the need for western coal. NCM uses a least cost linear model which, among other things, assumes the resumption of leasing to make available least cost coal."

Commenters 156, 130, 170, 172, 019, 079, 087, 071, 089, 061, 062, 067, 042, 187, 097, 193 and 121

Response. The modeling assumption that all coal — Federal and nonfederal—is available provides a projection indicating how much production would occur without environmental, federal leasing or other constraints. Model runs are also made which specify that no Federal leasing will take place. It can then be assessed whether leasing of federal coal is necessary to achieve such a level of production. Any shortfalls that would occur without new leasing provide an estimate of the need for new leasing. This is a standard with and

without technique also used widely in traditional benefit-cost analysis. The decision might still be made not to lease for environmental or other reasons, or special environmental constraints could be introduced into the model. The purpose of the national coal model is not to maximize production, but to determine the least cost way of providing for national electricity and coal requirements. Estimates of underground mining versus surface mining reflect the higher costs of underground mining.

8. **Comment.** "The linear NCM model does not have a feedback mechanism to account for such certain constraints, or those due to environmental or socio-economic considerations."

Commenters 156, 170, 172, 079, 071, 061, 062, 067, 121, and 089

Response. This consideration is given to adding feedback constraints due to shortages or bottlenecks into future model versions. However, for projections 5 and 10 years in the future, there is still considerable time to make adjustments to avoid such bottleneck constraints, and these will be considered in the subsequent environmental analysis and in the two year regional production goal and leasing target setting procedures.

9. **Comment.** "Since the NCM production projections are linear programming model, the program alternative which depends on these projections similarly emphasizes production from the Powder River Coal Region. A policy of no new leasing would restrict available productions both by preventing expansion of the Federal coal lease reserve base and by affecting the economic viability of the Federal coal lease reserve base and by affecting the economic viability of private coal dependent upon adjacent Federal reserves for their development."

Commenters 121, 156, 147, 130, 170, 172, 187, 019, 079, 087, 071, 089, 061, 062, 067, 042, 097, 193 and 121

Response. Electric power and coal requirements are specified by consuming region, not by producing region. Thus, Montana, Idaho and Wyoming form one consuming region in the model with specific electric power and coal requirements. The model then solves for the least cost way from a national perspective of supplying overall electric power and coal requirements. The regional distribution of coal production results from the solution to this cost-minimizing problem. There are no initial assumptions as to the role in coal production from any region (except that production must be at least as great as already committed regional production). The high production projections in the Powder River Basin result from the fact that total national costs for electric power production and coal transportation and mining are reduced by placing major reliance on the large and inexpensive surface minable reserves in this region.

10. **Comment.** "Any econometric model is basically inadequate. The DES acknowledges the existence of more advanced end-use forecasting methodologies, but dismisses using them as too time consuming and costly."

Commenters 156, 147, 130, 170, 172, 187, 019, 079, 087, 071, 089, 061, 062, 067, 042, 097, 193 and 121

Response. The DOE model is a linear programming, not an econometric model. It can be adjusted to reflect greater conservation expectations and reduced energy demands by changing the electric power and coal use growth rates. There are benefits to end-use analyses in that the specific circumstances of users are taken into greater account. On the other hand, these techniques are costly to apply on a national basis. It is also less easy to take account of factors such as the impacts of basic economic growth trends on electricity demands. Greater use of survey and other demand estimation techniques may be made in setting electricity and coal use assumptions for future production target setting. The entire production goal setting process will be reviewed and updated biennially.

11. **Comment.** "Table 2-29 on Page 2-45, 'Summary of Planned and Projected Production,' indicates that Fort Union would produce 21.8 million tons in 1985. Department of Interior's data on coal production should be correlated with the data from the Regional EIS."

Commenters 184 and 066

Response. The production projection for the Fort Union Coal Region of 21.8 million tons shown in Table 2-29 was developed by DOE. As shown in Table 5-2, for the purposes of environmental analysis, DOI modified the DOE projection to 31.9 million tons for the Fort Union Coal Region, partly because of the higher Fort Union regional EIS figures mentioned in the comment.

12. **Comment.** "Another factor which will result in the likelihood of demand levels lower than projected by DOE is the recent authorization granted to the EPA to require the use of local coal."

Commenters 089, 019, 079, 071, 061, 062, 066, 067, and

Response. Since EPA orders to use regional coal are issued on a discretionary basis, and seem to be somewhat controversial, there is almost no way in which this factor can be modeled. Predictions on how much coal production might shift from west to east would be highly speculative.

13. **Comment.** "How do exports fit into regional demand estimates?"

Commenters 019 and 089

Response. Export requirements are incorporated into regional coal demands in the specification of coal consumption assumptions for the DOE projections.

14. **Comment.** "DOI's estimates of total planned and likely production with which the DOE need projections are compared include planned and likely production from mines on existing Federal leases, planned production from Indian Lands and planned production from wholly non-Federal mines. Not included, however, is the production potential from outstanding Preference Right Lease Applications."

Commenters 089, 079, 042, 130 and 097

Response. It should be noted that issuance of preference right leases would constitute new leasing. PRLA production potential is not included in Table 2-29 because production projections for 1985 can already be met without resort to PRLA potential except in the Green River-Hams Fork Region. In this region, there is very little PRLA production potential. In Table 2–30, which examines 1990 leasing needs, PRLA production potential is in fact included, but as a separate column. This allows PRLA potential to be distinguished from the more stringent definitions for "planned" and "likely" production. Much of the total PRLA production potential is suitable only for underground mining, which has poor prospects in most areas. Of the 250.8 million ton annual PRLA potential, 143.6 million tons per year consist of potential underground mining in the Powder River Basin where it is generally recognized that little if any underground mining will occur for many years. Only 90 million tons per year represent PRLA surface mining potential that may actually have a high likelihood. This potential is shown in Table 2-30.

15. **Comment.** " *Regional Production Targets.* Both the manner of intended application of regional production targets and the timing of their use presents serious difficulties."

Commenter 098

Response. DOE and DOI will be undertaking further efforts to develop production projections that are as accurate as possible. Further studies will be made to determine the best ways of translating regional production targets into federal leasing objectives.

16. **Comment.** "We question the assumption that exports will increase by nearly 50% between 1977 and 1985 as is indicated in the DOE projections."

Commenters 089 and 019

Response. The increase is much less than 50 percent. Projected coal exports in 1985 are 73.7 million tons. In 1970, U.S. coal exports were 70.9 million tons and in 1975 they were 65.7 million tons. Thus, although there have been ups and downs, little increase in export production is projected compared with recent higher years for U.S. exports.

17. **Comment.** "Since the preferred leasing system will superimpose production levels from above (DOE national projections), it would seem important to have some idea of what the ratio of outstanding leases granted/actual production levels should be. At this point in time the ratio of coal tonnage potentially available annually (based on a 30-year mining life) to existing Federal production is something on the order of 15:1. Recognizing the numerous constraints to development, has the Department given thought to what kind of ratio would be appropriate assuming that most leased areas would be developed?"

Commenter 281

Response. The Department recognizes that there will be a need to maintain some level of on-the-shelf, non-producing coal leases. This level will be addressed as part of the Secretary's decision on the levels of regional leasing needed during the coming decade. The Secretary's decision paper on need for leasing will discuss the topics set out in this comment. Finally, the 15:1 potential production to actual production ratio cited in your letter

is not the ratio that would be chosen by the Department as a matter of policy, and, judging from the amount of activity in mining plans being processed, the actual ratio will soon be greatly lower. Determination of the proper ratio requires consideration of future changes in production goals, the necessary lead time allowances, and the percentage of leases that might never reach active mine production.

18. **Comment.** "Because of the uncertainty involved in establishing 1990 production figures for western coal, we strongly urge the Secretary to hold off any decision on the need to lease until after EPA has reached a final decision on the NSPS and DOE has an opportunity to analyze the coal demand impacts of that decision."

Commenters 097 and 066

Response. EPA computer projections indicated only minor changes in western coal production according to the proposed new source performance standard (see Section 2.4).

19. **Comment.** "The ICF model overestimates Western coal demand."

Commenter 097

Response. The Interior Department believes that the range from low to medium to high projections covers likely future western coal production levels. The model will be reassessed and updated regularly to introduce any needed technical refinements or new assumptions.

20. **Comment.** "The inherent flaws in the DOE model give rise to serious doubts concerning its fitness as a tool for decision-making. These problems are compounded by the choice of assumptions and inputs on crude oil price, natural gas price, electricity growth rates, etc., employed in the DOE model adopted in the Draft ES."

Commenters 097, 156, 089, and 066

Response. Any likely coal production levels are covered in the low-medium-high range developed in Chapter 5 for analyses of the preferred program and the no leasing alternative. Coal projections will always be subject to modification as new information becomes available. In making a basic long-term decision such as whether to adopt a coal management program, fluctuating changes in coal production expectations should not be major factors. The assumptions employed by DOE in its modeling are generally reasonable, although certain changes, may be required. See other comments on specific assumptions.

21. **Comment.** "Input factors which DOI considered in its production target 'adjustment' process are listed in Appendix H, however, demand for the coal does not appear to be included."

Commenter 121

Response. The "predetermined" western coal production levels referred to are the DOE coal production projections adjusted for the effects on regional production of the different federal coal management alternatives. Coal demand is closely reflected in the DOE production projections and the adjusted figures derived by DOI.

22. **Comment.** "The DOE estimates of coal required for synfuel production and exports are overstated. For example, the low projection for 1985 was based on the assumption that seven (presumably liquefaction) plants with a capacity of 10,000 barrels per day each will be in operation by 1985; the medium and high projections assume thirteen and twenty-seven plants respectively. In view of the extensive Federal funding which will be required to make such facilities available on a commercial scale in the near future, we question the realism of these estimates."

Commenters 089 and 066

Response. Production of 10,000 barrels per day (oil equivalent) would be suitable for no more than a small demonstration plant. A single full scale commercial synfuel operation would produce in the range of 50,000 to 100,000 barrels per day. Production projected from the American Natural Gas plant in North Dakota, for which permits are now being sought, was recently scaled down from 100,000 to 50,000 barrels per day. Hence, the low 1985 assumption for synthetic coal use of 70,000 barrels per day is basically only one full scale commercial facility. Similarly, the medium and high assumptions would not require 13 and 27 full scale facilities, respectively. However, there may be a need to reduce somewhat the expected medium and high levels of synthetics production for 1985 at least.

23. **Comment.** "How does the BLM anticipate improving its data base to a level capable of making tract specific leasing decisions?"

Commenter 121

Response. In recent years BLM has made considerable expenditures for new inventories and other data gatherings. Further efforts would be continued as part of any coal manangement program. Where broad-area data are not available, BLM may have to rely on data specifically gathered for proposed leasing tracts.

24. **Comment.** "Industrial coal demand is overstated in the DOE projections."

Commenter 089

Response. Industrial demand is difficult to project. The National Energy Plan projected large increases in industrial coal use, but these were widely criticized. The rapid rises in oil prices, however, have spurred renewed expectations of possible major increases in industrial coal use. The assumptions for industrial use will be reexamined in the next projection update.

SUPPLY AND DEMAND

1. **Comment.** "The DES seems to imply that the largest reason coal needs to be mined in the West is that it is required there. This might be an appropriate and meaningful statement if one were not to question the definition of 'West'."

Commenters 118 and 097

Response. The largest reason for mining in the West is the need to meet national energy requirements. A substantial part of these requirements are in the West and can be met by western coal.

2. **Comment.** "The assumptions which underlie the ES's discussion of need for additional leasing greatly inflate the expected levels of supply and demand for coal, leaving us with an analysis which badly distorts the true situation and could be used to justify a need for leasing where none exists."

Commenters 060, 097, 118, and 281

Response. The low to high range of coal projection assumptions is very wide. High assumptions tend to promote western production, while low assumptions inhibit it. The range should be wide enough that most reviewers can find their own views as to the most likely energy and coal production within this range.

3. **Comment.** "Most non-Federal coal reserves in Montana have been eliminated from consideration in the DES because they occur outside the regions covered. Potential production from non-Federal reserves could be important in Montana without additional federal leasing."

Commenter 071

Response. The areas in Montana with major nonfederal ownership outside the Fort Union and Powder River Coal Regions are projected by DOE to have little current development prospects.

4. **Comment.** "We believe that environmental protection and recent law enacted for that purpose both require a resource management policy in which coal management decisions must take place. However, the DES confuses the questions after failing, we believe, to definitively address demand and supply."

Commenters 097, 118, and 060

Response. The issues of supply and demand are addressed in Chapter 2. The elements of the prefered coal program which provide environmental protection are explained in Chapter 3.

5. **Comment.** "The major flaw in the PIES model is that it consistently overstates energy demand."

Commenter 097

Response. Predicting future energy production is an inherently very uncertain activity. Regularly revised forecasts of coal production will be prepared to try to keep as current as possible.

6. **Comment.** "The draft environmental statement does not give adequate consideration to alternatives for meeting the nation's energy demand."

Commenters 089 and 134

Response. The Interior Department did not originate the conclusion that coal should be a main avenue for reducing dependence on foreign oil. Heavy reliance on coal has been central to the National Energy Plan and almost all other analyses of national energy policies. It is unrealistic to expect that the Interior Department should perform a comprehensive analysis of alternative energy sources and the future relative national reliance on these sources as a part of this EIS. This responsibility belongs to DOE and also involves other parts of the executive and legislative branches in a continuing process. Similarly, any major analysis of national energy conservation potential would go far beyond a proper scope for this EIS. We note that a great many documents have been prepared by the Federal government on this topic including the recently completed CEQ

Report entitled 'The Good News about Energy". We think that these previous documents present the issue in great detail and the summary type materials in the statement are better suited to assist the decision-maker and the public in evaluating the proposed action.

7. **Comment.** "Although the assessment of likely coal production on pages 2-30 through 2-38 assumes current mining plan estimates of annual levels of production over a 30-year period, recent experience has shown that existing mines are capable of significantly increasing their production if the demand is there. We can find no legal or other obstacle under current legislation that would limit yearly increases in production. It appears that the economics of this approach are attractive, requiring minimal additional capital investment.

"Increases of production beyond mining plan levels do appear to pose considerable uncertainty to those planners who will try to estimate future leasing needs. Has the Department tried to make an assessment of what the upper limit of annual coal production is likely to be over time in terms of a minimum number of years of production from a lease? Are there any other practical constraints that would lessen this tendency to maximize production from industry's existing leases?"

Commenter 281

Response. The Department has not estimated what the upper limit of coal production from existing leases might be for all-out production. The Department views short term bursts in production lasting from a few months to a few years as not terribly relevant to the long term (5- to 10-year frame) decisions on need for coal leasing that must be made in this program. Maximum mine production is costly to sustain over the long term. New mines will be supplying coal that is less costly because it is being removed at a more orderly rate. These mines would be expected to be able to bid away any short term advantages an existing mine might gain from an increase in production due to a sudden increase in coal demand. Such increases in coal demand were seen in 1978 due to the shutdown of certain major coal fields during a strike. Men and equipment can be pushed at maximum effort for just so long before productivity falls and costs rise. Rising costs at the mine caused by too rapid an extraction rate will quickly be seen in rising consumer energy bills. The Department is aware of the importance of its assumptions regarding typical mine life and will revise them if the industry norm changes. The Department will also consider readjusting the typical mine life if the Department of Energy exercises its authority in the area of diligence to force tracts to be mined out at a faster rate than the presently specified 40 year maximum time.

REGIONAL BOUNDARIES

1. **Comment.** "There is no rationale developed for the selection of the 12 coal supply regions."

Commenter 025

Response. Regional boundaries were selected to represent common coal types, transportation routes, market areas, socioeconomic concerns and other common features. Future consideration will be given to changing regional boundaries if there appear to be problems with the current ones.

2. **Comment.** "The Colorado region, west-central Colorado should be in the Green River-Hams Fork production region."

Commenter 196

Response. A recheck of the west-central Colorado region does not establish that it should be moved to the Green River-Hams Fork region. However, regional boundaries are not unchangeable and the issue can be considered again in the future.

ALTERNATE ENERGY SOURCES

1. **Comment.** "Statement on p. 2–17 indicates that national installed hydroelectric capacity decreased from 1975 to 1977. This seems doubtful. Perhaps megawatt-hours produced decreased."

Commenter 121

Response. The statement should refer to actual production, not capacity. Production declined because of low water conditions due to drought.

2. **Comment.** "The discussion of solar energy is totally without substance."

Commenter 097

Response. Solar potential is a subject of wide controversy. The Department believes the estimates given are reasonable to the purpose of this program evaluation and that the full potential of solar can be considered in subsequent production goal estimates, widely available studies can be consulted if more detail is needed.

3. **Comment.** "One other task that the Department could undertake would be to expand on its brief discussion of Nontraditional Energy Sources."

Commenter 097

Response. The ES is focused on coal. Extensive discussions of other energy sources, traditional and nontraditional, can be found in referenced materials. Most readers would not be served by locating such discussions in Chapter 2 itself.

4. **Comment.** "Section 2.5, and particularly section 2.5.1 should be expanded to more fully consider the volatility of the international petroleum market."

Commenters 090 and 121

Response. A discussion has been added in Section 2.5.1 of the increased instability in the Middle East due to the Iranian change in government. Section 2.5 addresses noncoal energy sources. Coal is then discussed in Section 2.6.

5. **Comment.** "The trend of increasing production of oil and gas from the 'overthrust belt' is not discussed. Supplies becoming available from this new source should markedly affect growth of coal demand in the West, where it is stated that the majority of Federal leasing would take place."

Commenter 233

Response. This point has been added to Section 2.5.

EAST VS WEST COAL PRODUCTION

1. **Comment.** "Section 2.2 (page 2-3) makes reference to the fact that although the vast majority of low-sulfur coal reserves are in the western coal states, there are substantial low-sulfur reserves of coal in the East. This fact has been misconstrued by many critics of renewed Federal coal leasing to indicate that such low-sulfur coal in the East is a readily available and viable alternative to expanded Federal coal leasing."

Commenter 066

Response. As noted in the DES, much of eastern low sulfur coal is metallurgical. Because of the price premium metallurgical coal gets, expense would certainly be a major factor in any proposed plans to rely on eastern low sulfur coal for steam generation.

2. **Comment.** "Section 2.4 (page 2-10) discussed the effect of recent changes in Federal air pollution standards for coal-fired power plants with the incredulous conclusion that: 'Overall demands for western coal will not be greatly affected by the new air quality standards, because most new demand for western coal will be from power plants and industries in the West."

Commenter 066

Response. EPA studies indicate that new proposed sulfur standards will reduce western production by at most 10 percent. See additional discussion in Section 2.4.

3. **Comment.** "The DES justifies the large shift in coal production westward in part due to more rapidly increasing demand in the West. This is misleading."

Commenters 156 and 061

Response. Where coal is converted in the West and then the final energy product is consumed in the East, the use of western coal for western consumption purposes is in fact overstated. However, the great majority of western coal used for eastern purposes would be exported to eastern regions. The most important reason for the more rapid rate of growth in coal use in the West is the low base from which it starts. In the East, there has been extensive use of coal for power generation while such use is only now becoming common in the West.

4. **Comment.** "Nowhere in the DEIS was there a full analysis of the impact on the DOE forecasts of a limitation on Federal coal availability."

Commenter 090

Response. In Table 5-18 estimates are developed of the impacts on western and eastern coal production of alternative Federal coal management programs, including no leasing.

5. **Comment.** "Regardless of any alternative, there appears to be a need for separate coal management programs for the eastern and western U.S. due to the vast differences in regional environment."

Commenter 052

Response. The Department must manage eastern as well as western coal according to FLPMA, SMCRA, FCLAA, and other laws. Recognizing the requirement in these acts, the Department cannot find any benefit to developing two programs which would, by law, have to be substantially the same. The program does allow

the comprehensive land use planning step to be modified if the Federal resource in question is relatively insignificant and it can be managed in accordance with a state or local government land use plan. .

EXISTING LEASES

1. **Comment.** "USGS mining supervisors estimated that 57.3 million ton production will result from existing leases which do not currently have mine plans. These estimates are entirely undocumented."

Commenter 156

Response. Whether or not a particular lease will get into production by 1986 is a judgmental estimate. It would be difficult to formulate any rules for making such judgments. Factors taken into account included lease size, mining cost, environmental problems, coal type and transportation. The estimates were made by GS mining supervisors who have first-hand knowledge of the circumstances of individual leases. The estimates were made in fuller form in task force reports and use data now incorporated into the Department's automated data system.

2. **Comment.** "In Section 2.8.2, the assumption is made that actual production of coal is not likely to occur until five (5) to ten (10) years after issuance of a lease."

Commenter 168

Response. It is likely to require at least one year to prepare a mine plan, one year to write and approve the plan, and two years to open the mine. Four years appears to be the bare minimum — assuming everything goes as fast as possible.

3. **Comment.** "In the document there is an absence of any resolution of the unnecessary existing leases in the environmentally unacceptable regions of the country, especially the West."

Commenters 130 and 105

Response. A new section in chapter 3 and a new appendix have been added to address all the elements of the program that affect existing leases.

4. **Comment.** "By starting with the KRCRAs as the areas in which coal leasing must occur, the Department has already and without any detailed industry input, excluded at least three-quarters of Federal coal lands from leasing."

Commenter 066

Response. The existing and planned KRCRAs include the areas with Federal coal that are believed to have any significant current development prospects. As industry or Interior exploration points out new areas, the Department will examine these areas and create new KRCRAs as appropriate. Congress has prohibited the Department from leasing lands which have not been classified for competitive leasing.

5. **Comment.** "Table 2–30, column 4 gives a figure of 11.3 million tons. This figure was calculated using small PRLA's which the BLM's Albuquerque District acknowledges can't be developed individually, or mined at all without the development of adjacent coal."

Commenters 019 and 097

Response. PRLA production potential was not surveyed by size of the PRLA. It is possible that some of the PRLAs would be too small to be developed. On the other hand, some of them could be incorporated into larger mines that included nonfederal coal and/or existing federal leases.

6. **Comment.** "Santa Fe emphatically rejects the "subalternative" of "not leasing in checkerboard areas" (4–136). The DES presents no practical justification for such a policy."

Commenter 096

Response. A policy of no checkerboard leasing was not one of the alternative coal management programs analyzed in the EIS. It is brought up more as a possibility that might in some circumstances be discussed. As it is discussed in Chapter 5 and in the Department of Justice's Report on Competition in the Coal Industry reasons for not leasing coal in those areas include the difficulty of having truly competitive leasing where one entity controls half of the resources.

7. **Comment.** "The potential of Indian leases is underestimated."

Commenter 097

Response. We believe the estimates are reasonably accurate and in the absence of new information to the contrary, have not changed them. Production of Indian coal has been well below expectations of a few years ago. Indian tribes are divided and uncertain as to the extent that coal development should be promoted. Legal disputes have tended to hold up Indian coal development.

Since no new evidence was submitted with the comment, no change was made.

8. **Comment.** "The lack of clarity continues in the review of the 172 outstanding PRLA's. The Draft ES accurately notes the significant reserves associated with PRLAs and then does its best to discount the potential."

Commenter 097

Response. The production potential of PRLA's reserves is substantial where they are surface mineable as discussed in Section 2.7.1.3. Underground PRLA reserves have limited potential except in the Uinta-Southwestern Utah Coal Region.

9. **Comment.** "Section 2.8.3 of the DEIS reflects the Interior Department position that it 'has little choice legally but to process' preference right lease applications (PRLAs). This attitude is offensive to Western Fuels and to others who have invested substantial money and effort."

Commenter 090

Response. The statement was not meant to imply any attitude about processing PRLAs but simply to state the fact that the Department's legal position, thus far sustained in the Courts, is that it must issue a lease within a reasonable time after an applicant has complied with the Department's regulations and to distinguish this from the competitive leasing situation where the Department has the discretion not to lease.

10. **Comment.** "The Department's argument that new leasing is required for legal and administrative purposes rests mainly on the legal requirement to process outstanding PRLAs. This, however, does not require the resumption of competitive leasing."

Commenter 097

Response. The Department's proposal to resume issuance of PRLAs is discussed in Sections 2.8.3, 3.1.1.6, 3.1.3, 3.1.4, 3.1.5, 3.1.6, and 3.1.7. In addition a new section is added to Chapter 3 and Appendix I which bring together and summarize all of the Department's proposed actions for PRLAs. It is true that the Department does not have the same legal obligation to proceed with competitive leasing as it does with PRLAs.

11. **Comment.** "Section 2.8.2 of the DES indicates that a decision by the Federal government not to lease Federal coal could result simply in a shift to the development of non-Federal coal sources."

Commenters 090 and 281

Response. These points are made in Section 2.8.2. A full examination of the impacts of development of non-Federal coal would require study of alternative Federal and non-Federal mining sites in each region. Such a study can better be done on a regional basis. Chapter 5 presents an analysis of interregional shifts in production due to no leasing.

12. **Comment.** "Table 2-5, the Hospah KRCRA is left out."

Commenter 019

Response. The Hospah KRCRA was not established until July, 1978. The study on which Table 2-5 was based included only KRCRAs established before March, 1978.

13. **Comment.** "Do we really want to chase production off unleased Federal coal lands and onto fee areas and existing lease tracts?"

Commenter 197

Response. The Department's only explicit policy in this regard is to favor development of coal lands underlying federally owned surface to development of those that do not, all other factors being equal. The relative benefits of development of private and federal lands are discussed in Section 5.4.

14. **Comment.** "As a first step, the Department needs to present a detailed discussion of the status of the present Federal leases and PRLAs. We are aware from the earlier programmatic EIS, that the Department has made some evaluation of the environmental merits of existing leases and PRLAs. Yet this most critical discussion has not ever been presented for evaluation in a public document. We believe this should be presented in the final EIS. A necessary first step would be to identify the size and location via regional maps of these leases (with and without mining plans) and PRLAs in the final EIS. EPA is also aware that the Department has begun an evaluation of high-priority Management Framework Plans in coal areas using the proposed unsuitability criteria. We have some reservations regarding the criteria as presently listed (discussed below). However, we think that an essential first step in implementing the transitional phase of the Federal coal program would be through unsuitability evaluation of existing Federal leases and PRLAs. Only when it is

possible to determine the number and amounts of existing leases that are environmentally and economically unsuitable can an intelligent appraisal of needed new leasing be made."

Commenter 281

Response. Because of the concern with existing lease and PRLA management, the Department is including with the final Environmental Statement a "Discussion paper on Departmental management of existing coal leases and preference right lease applications" as Appendix I of the final ES. The principal points in the discussion paper have also been incorporated in chapter 3, the description of the preferred program and its alternatives. The Department does not believe that a presentation of the status of all existing leases and PRLAs would materially benefit the ES. This material would immensely increase the size of the ES with a level of detail that may be of some interest, but is of little use to decision-making. This material is available from the files of the Bureau of Land Management. The U.S. Geological Survey did include environmental viability as a factor in their assessment of the production potential of existing leases. The Department would be concerned about making public these necessarily undetailed, professional judgments regarding future environmental conflicts that might face specific leases and PRLAs. The Department does not want to be bound to these preliminary estimates of whether operation on an existing lease or PRLA will or will not create problems or be permittable under SMCRA. Unsuitability assessments and the weighing of other environmental conflicts are an essential part of the process of adjudication of the preference right to a lease. It is beyond the scope of this ES to adjudicate the 172 pending PRLAs on their merits. In addition, the Department regards it as fruitless to conduct special assessments of existing leases for acceptability for development if no development is contemplated by the lease. The lack of production from such leases can be safely assumed in setting leasing targets without any further environmental assessment at all.

15. **Comment.** "Although we can sympathize with the U.S. Government's desire to promote greater competition in the western coal industry, we wonder whether additional leasing will have any practical benefits in this regard. It would appear that willing producers not now owning leases could do so simply by buying them (through the assignment process). Will additional leasing change this situation in any discernable way? Other reviewers have indicated that there seems to be a tendency to concentrate the leases that have been sold. Recent sales of leases have been to large corporations. We wonder whether a situation of greater competition among lease holders might result from new leases rather than among coal producers. We do recognize that diligent development requirements may alleviate this situation. We wonder whether a provision to eliminate re-sale of leases might further prevent concentration and speculation. Although there may be benefit in having re-sale of present leases, we can see no good reason why re-sale of future leases would have practical advantages to government or commerce. A lease could simply be returned and re-leased if necessary. Would a statutory change be necessary to implement such a provision, and if so, has the Department considered doing so? How will the Department police assignments that are made?"

Commenter 281

Response. The Department records indicate that most coal leases have passed into the hands of companies with the capital and the technical expertise to develop them. Previously there was an element in the coal lease market that was principally interested in the leases for their possible resale value. As the Secretary will first judge the need for leasing and then decide on targets for leases for coal production, the coal program should reduce the earlier high levels of speculation that were evident among Federal coal leases. The Department is making an effort to put coal leases in the hands of new groups of producers through the public body and small business special opportunity lease sales. These new entrants should enhance competition in the coal industry. The Solicitor's Office is now examining the question of legal limits on the Department's ability to manage assignments; the policy question you raise in your comments will be considered if is determined that such actions are within the authority of the Secretary. An advantage of assignments is that they do allow the Department greater certainty that the leasing targets will be met. That is, they increase the probability that the coal in any Federal area will be mined by some company, if not the original company winning the lease. If leases were to be returned for reletting, the

Department's ability to conduct leasing to satisfy a target would be lessened. The Solicitor's paper on assignment of leases will be available when it is completed.

16. **Comment.** "Para 2.8.3 This paragraph should acknowledge that it is presently illegal for the Secretary to make exchanges of existing leases and that Congressional legislation is necessary to give him this authority. This authority, by the way, is sorely needed, and should be addressed as a means of reaching the goals of the Preferred Alternative."

Commenters 019 and 135

Response. The Secretary does have limited exchange authority. In addition lease modifications and bidding rights may be usable for exchange with holders of undesirable leases. The Department is on record as favoring a general exchange authority, but is not recommending that the Congress re-open examination of this question until it can do so in the context of an operational coal managment program. The Secretary's authority in this regard is fully set out in a new appendix in the final ES.

NEED FOR NEW LEASING

1. **Comment.** "Para 2.8.4 states that increased leasing may increase competition in the coal industry, but it does not state how stifling to competition have been the laws issued since 1970."

Commenters 019 and 043

Response. The Department does not believe that on the whole the laws passed since 1970 have stifled competition. The reverse appears to be true since new laws require: competitive bidding with bonus bids defered at least half of the time, impose more strict acreage limitations, ease entry into federal coal for public bodies and involve Justice Department pre-lease issuance anti-trust review. The Justice Department noted in its report to Congress that all markets are workably competitive, but leasing should resume to prevent future problems.

2. **Comment.** "The DES seems to assume that cancellation of leases in 1986 will create an abrupt discontinuity in production potential that can only be avoided by new leasing prior to that time. The fallacy in this position is that production estimates are based on current intentions, leading naturally to a shortfall in the longer term."

Commenters 042, 060, 062, 043, and 097

Response. The Interior Department intends to cancel existing leases not producing by 1986. Leases lacking production plans now will have a difficult time in achieving 1986 production. If there is to be a supply of new Federal leases available to begin production from 1987 on, these leases must be awarded well before the year production is expected to begin. From four to seven years after lease issuance is likely to be required to get a mine into production. Hence, if production is expected from new leases in 1987, these leases should be issued soon.

3. **Comment.** "Don't just encourage 'new entry in coal mining' to encourage competition."

Commenter 160

Response. It is not clear from the comment what is suggested. The Justice Department is primarily concerned with controlling outright collusion. The Interior Department's greater Federal leasing will aid in dealing with this problem.

4. **Comment.** "The analysis of national need for leasing is based on a questionable and illogical assumption that national need can be determined on a regional level at a later date."

Commenter 058, 043, and 038

Response. It is difficult if not impossible to assess the national need for leasing without looking at regions. The national leasing need is the cumulative need that results from the separate circumstances of the regions where Federal coal is found.

5. **Comment.** "There is a puzzling sentence in the ES which reads 'The principal consequences of leasing less Federal coal than is needed to meet national energy objectives would likely be to alter patterns of coal development, both at the national and regional levels'."

Commenters 103, 168, 062, 187, 097, 096, and 087

Response. According to computer projections of coal production under a no leasing scenario, the greatest impact of an absence of Federal leasing would be to shift coal production from Federal to nonFederal coal. In some cases such shifts would occur within the same coal region. In regions without much nonFederal coal, an absence of Federal leasing would cause production to shift to other regions with greater nonFederal production potential. The effect of these shifts would be to

alter coal development patterns, and the decline in overall national coal production under a no leasing policy probably would not be very great. The greatest cost to the Nation of no leasing thus would probably be in the less environmentally satisfactory and less economically efficient development patterns that would result.

6. **Comment.** "In the final analysis, the Department bases its justification for adopting a new coal leasing program on the perceived future need for vast amounts of Federal coal."

Commenters 097, 042, and 103

Response. At the risk of oversimplification, it would base this decision on its evaluation that (1) Congress has given it the authority to manage Federal lands (2) Federal lands contain vast amounts of coal (3) under some conditions it is clear that this coal can make an important contribution to national energy needs and (4) the Department must be ready to respond to any needs that do occur with a program that will work quickly, efficiently and result in environmentally sound development. The Department is not basing its proposal to adopt a program directly on any specified level of need for leasing whether it is characterized as vast or miniscule.

7. **Comment.** "The Department proposes that new leasing is necessary to promote desirable patterns of coal development. This argument assumes that private coal development patterns will be undesirable."

Commenters 097 and 103

Response. The environmental statement discusses the pro's and con's of developing private versus public lands for coal in Chapter 5. The analysis shows that on a general review there are comparative advantages and disadvantages to develop each. These include factors such as proximity to transportation, effect on wildlife, grazing, agriculture and availability of land for new housing. Because each region has different characteristics, however, it is very difficult on a national level to "prove" that Federal development is better than private development or vice-versa. This is one of the factors that could be studied in any regional coal leasing statement.

8. **Comment.** "A sound Federal management program is an essential element of a national coal resource management strategy that can serve to mitigate the impacts of a no-lease policy."

Commenter 122

Response. The Department agrees completely with this statement. One of the three major factors the Secretary will be asked to consider in making his decision on the need for leasing is the environmental benefits that will result from relying on a soundly planned Federal coal management program. Starting up the program not only benefits the environment from the greater degree of planning for new mines, but also, and possibly more important for the short run, benefits such other elements of the coal management program as lease exchanges, existing lease management, and preference right lease application management.

9. **Comment.** "In its zeal to escape the problems created by errors rampant in earlier leasing efforts, the Department has established a program primarily aimed at new leases."

Commenters 103, 042, and 058

Response. The Department has proceeded with equal emphasis on the management of existing leases and on the need to study and prepare for a new leasing program. Additional material has been inserted in Chapter 3 that explains these efforts.

10. **Comment.** "Two questions of great interest to us with regard to the proposed Federal coal management program are, one, how it was decided how much coal needs to be mined and, two, how is it decided which new land should be leased for coal mining. I will just briefly outline our concerns on these two issues tonight and also submit further comments before the deadline."

Commenter 134

Response. In answering these questions the Federal coal management program will consider the following major factors:

1. The DOE National Energy Plan target figure for coal;
2. The advice of the individual states;
3. Information available on industry plans for future mine openings and expansion;
4. Utility industry future plans;
5. Industry expressions of interest in Federal coal leasing;
6. Development potential of Federal coal deposits;

7. Recommendations from the public, state and local governments, and other Federal agencies;
8. Environmental and social capacity of various areas to withstand coal mining.

Many of these factors are set out in the ES, but the ES does not draw a conclusion. This conclusion will be reached by the Secretary after he has considered the ES and comments received on the preferred coal management program.

11. **Comment.** "The preferred alternative seems the most sound of the seven presented. However, throughout the report and particularly in Chapter 2, it is emphasized that new coal leasing will be necessary to satisfy future demand since nearly all existing non-producing leases will be cancelled in 1986. The incongruity of this situation (cancelling leases and issuing new ones at the same time) should be examined further. Once the coal management program policies and criteria are applied to existing non-producing leases as outlined in section 3.1.1.5, it might develop that enough acceptable leases of commercial quality exist to obviate or reduce the need for a new leasing program. Although some means might be found to get the good idle leases into production, the possibility is never discussed in the DES."

Commenter 233

Response. The Department prefers that good idle leases come into production and that these leases reduce the need for new leasing. The Department is certainly not pursuing a policy of aggresively cancelling existing leases during the period before diligence requirements come into play. Quite the opposite, the Department is seeking to encourage the development of these leases within the next seven years if they are environmentally acceptable. Congress, through its provisions to ensure the diligent development of coal leases, established standards that would require the cancellation of leases that are not in production by 1986. There is also provision in the existing regulations to consider the particular circumstances of each lease and possibly offer some form of relief to existing lease holders. The entire policy area of diligent devlopment, while administered by the Department of the Interior, falls within the policy setting powers transferred to the Department of Energy by the Department of Energy Organic Act.

DILIGENT DEVELOPMENT

1. **Comment.** "Our concern is with the criteria for due diligence which are now inadequate to their intended purpose of keeping Federal resource management in the hands of Federal land managers."

Commenter 042

Response. The Department of Energy is responsible for issuing new diligent development regulations. DOE is examining possible means to tighten diligent development standards in the course of preparing regulations. We note that the Congress considered but rejected tougher standards prior to the time it passed the Federal Coal Leasing Amendment Act. The Interior Department is also exploring ways to ensure the enforcement of the current standards.

2. **Comment.** "The Department argues that if demand is not strong enough to stimulate development of existing leases by 1986, the enforcement of diligence requirements will result in the cancellation of these leases, necessitating new leases in order to meet demand by 1990. The argument does not make sense, however, in view of the fact that the Secretary of the Interior has discretion to extend that period for five years."

Commenters 089, 163, and 062

Response. The five year extension has only limited applicability. In addition, the Interior Department cannot plan its future leasing on the assumption that diligent development standards for existing leases will be relaxed. Many of these leases would be environmentally and economically inferior to potential new leases. Demand may be insufficient by 1986 to stimulate production in that year, but increased demand in subsequent years may require new leasing to accommodate production starting up in those years. If no leasing took place, this might affect the Department's decision whether to extend the period, rather than vice-versa.

3. **Comment.** "In the meantime, we cannot understand from the ES why existing leases, if diligently developed, will not meet coal needs."

Commenters 163, 089, and 042

Response. Existing leases for meeting coal needs will generally only be available until 1986, when they are expected to be cancelled if not yet producing. New development of Federal coal after that will require new leasing well before the

production is expected to begin, if demand equals or exceeds the medium projection levels.

BONUS BIDS

1. **Comment.** "It is difficult to support the conclusion that an excess of leases offered would result in so much less compensation being paid to the government in lower bonus bids that the resulting loss would not be more than offset by the total gain realized when even a few such leases are developed."

Commenter 066

Response. Excessive leasing would create strong pressures for reduced bonus bids and production distortions. While certain measures could be taken to counteract these pressures, these measures would have costs and there would be no guarantees of success.

STRIP MINING RULES

1. **Comment.** "Does the decision to suspend the effective date of the strip mining rules affect the coal leasing ES?"

Commenter 121

Response. The coal programmatic ES involves long term issues not significantly affected by the effective date of the strip mining rules. This date could, however, affect decisions made under a new coal management program, if one is adopted.

PREFERRED PROGRAM

1. **Comment.** "We feel the statement should indicate the level at which various decisions in the proposed leasing process would be made. References are made throughout the statement to decisions to be made by the 'department.' To those not familiar with the Department of the Interior, its many bureaus and agencies, regional, state and district offices, the entire leasing process could become a confusing maze. We respectfully suggest that the final document indicate what offices or officers would be involved in the various steps depicted on the schematic flow charts on pages 15, 16 and 17 of chapter 3 (which are figures 3-2, 3-3 and 3-4)."

Commenter 159

Response. Chapter 3 of the FES contains more detailed information on the elements of the preferred program. The proposed regulations also clarify these relationships.

2. **Comment.** "A second major concern relates to implementation of the preferred program. Our questions relate to whether Interior will have the budget, expertise, and necessary legislation to see the preferred option through."

Commenters 155, 170, 098, 120, 147, and 083.

Response. The Department recognizes that this proposed program, as well as the new land use planning program mandated by FLPMA, will require more comprehensive resource inventories and socio-economic planning and impact assessment capabilities. The Department is requesting funds to meet these needs. In addition, it expects to depend to a greater degree on local and state government planning, particularly in the socio-economic area, in developing its own plans and the environmental assessments required by NEPA.

3. **Comment.** "Number 8, funding. As with other government programs funding and personnel are key elements of a successful endeavor. I am not concerned that Montana may be burdened–I am concerned that Montana may be burdened by this financial crunch. I have not seen an adequate assessment of the coal program budget and the State's role in that budget.

"The Environmental Statement clearly admits that it lacks a significant data base to implement the entire program in all of its regions.

"Base-line scientific studies are extremely vulnerable to budgetary cuts, which, conceivably, could jeopardize the proposed program. The legitimate demands of the nation and equally legitimate constitutional rights of present and future generations of Montana must be balanced."

Commenter 170

Response. The Department is fully aware of the budget and man-power requirements of conducting the program as proposed. It is recognized that obtaining the necessary support will be a continuing problem.

4. **Comment.** "CWI is concerned, however, that in seeking to achieve the maximum degree of environmental and community protection, on a national scale, the Department has created a system which is excessively complex, prone to extensive delays, and extremely unpredictable."

Commenters 120, 088, and 098

Response. The preferred program is not considered excessively complex, prone to delay, or unpredictable. Since many of its elements are

required by new law, it is unfamiliar. The Department believes that all involved will find the program is workable, not unduely lengthy, and understandable and that it strives to serve the public in an environmentally sound manner.

5. **Comment.** "Obviously, if you are going to have any coal mining at all you will have to have some people mining the coal. In other words, you are going to have to have industry or one person working on his own coal mine, and if this is so, you are going to have to have people producing the coal, and in this statement you hardly refer to industry at all, as I understand it, so I have just got one page here which I thought was rather significant. This is on Page 3-1 in your preferred program for Federal coal management. It's right at the bottom of the page. In this preferred program the four primary goals list things that are strictly your own business, you might say, that are pertaining to the Federal Government and not really what industry would be involved in. It seems to me like one of your four primary goals would be a harmonious relationship with the coal mining industry and I don't think you really indicate that at all in your Draft Environmental Statement, so my comments have been rather broad here."

Commenter 150

Response. The Department recognizes that coal is produced by private enterprise and the importance of having a program that will meet their needs. For this reason, the Department will look for industry advice and counsel during every major stage of the program.

6. **Comment.** "Individual coal operators should be compelled to internalize the cost of their operations on the impacted local communities by contribution of front end money for community development."

Commenter 160

Response. The Department agrees that the burden of meeting these financial needs should be placed on the coal production and conversion activities. The methods for accomplishing this should be determined by state and local governments.

7. **Comment.** "As the title of the Draft ES acknowledges, the 'Preferred Alternative' is much more than a Federal coal *leasing* program. The title calls it a Federal Coal *Management* Program. *Given* the massive mineable coal deposits owned by the U.S. which 'overhang' the coal industry and the markets for the coal industry: *given* the mine shutdowns occurring in the east as the OSM regulations are applied and the costs of complying with OSM, EPA, OSHA and other agency regulations become apparent; and *given* the necessity for significantly increasing coal production to stand any chance for our Nation to avoid economic disaster resulting from physical shortages of energy or from the Nation's inability to afford higher volumes of higher priced oil from overseas; knowledgeable people will recognize the Proposed Program is *more* than a Coal *Management* Program. It is a coal control program. By reason of the foregoing, it is a *National Coal Control Program.*

In essence; the government will determine what coal is needed; what to make available; where and when to make it available; what must be mined; how it will be mined; at what production rate; at what return on investment and possibly how, where, and by whom the coal will be consumed.

Query: If Congress set out to nationalize the nation's coal industry what further 'controls' would be necessary to achieve that result beyond what the 'Preferred Alternative' provides?"

Commenter 053

Response. The Department acknowledges that the Federal government will estimate national demand for coal, estimate how much of that amount will come from each of the proposed production regions and of that amount, how much should come from Federal lands. The Department will be responsible for leasing enough Federal coal on each of those areas to meet that estimated demand. (These goals may not be met if they are incompatible with the previously developed land use plans.) In addition to the above Congressional directives, the Department must insure the maximum economic recovery of the coal resource and a fair market value return for Federal resources. Limits are also placed on production by the diligence requirements. The Department is not proposing any rules that would prescribe end use: however, there are other Federal standards, particularly air pollution controls, that will influence the end use of coal. The Department does not believe it is appropriate for it to recommend what steps are needed to nationalize the nation's coal industry. It should be noted, however, that most of the coal

being produced today is not coming from Federal lands and, therefore, would not be controlled by this program.

8. **Comment.** "Members of the association have attended the informational meetings in Billings and Miles City. It is our opinion the Draft Environmental Statement would propose the Federal Government restrict the marketing of coal from Federal lands by determining where a company that has a sale for coal is located. The Federal Government personnel would decide whether or not a customer for coal should be permitted to purchase coal from Montana or from Illinois or some other state. We believe this is contrary to the free enterprise system and opposes the process of the supply and demand marketing system that makes the United States economy function. We strongly oppose the Federal Government using the leasing of Federal coal in this manner to manipulate the the market place for coal, as defined in Sections 2.8.2. and 2.8.4."

Commenter 179

Response. The Department will not dictate any marketing terms for a particular company. The Department will determine the demand for Federal coal in a production region and lease that amount of coal to the highest bidders, assuming the amounts of coal demanded can be met within the constraints of established land use plans.

9. **Comment.** "Finally, we urge the preparation of a Regulatory Analysis in accordance with the provisions of Executive Order 12044, signed by the President on March 23,1978. The proposed coal management program appers to meet the criteria of section 3 of EO 12044." 1p "We also urge that the Regulatory Analysis examine the impact of the proposed coal management program upon the coal industry itself, as well as coal consumers. Such an analysis should be beneficial to the decision-making process, and, of course, should accompany the proposed regulations, when published."

Commenter 089

Response. Your comment in regard to regulatory analysis has been considered by the Secetary. He has decided to conduct enhanced economic analyses of maximum economic recovery and of unsuitability criteria.

10. **Comment.** "Interior's program must comply with a number of laws enacted by the Legislative Branch. Interior's program for leasing falls within the purview of NEPA and requires a 'legally adequate' ES. The Program and the required ES do not depend upon justifying the 'need to lease'. Futhermore, leasing itself is no longer, if it ever was, a 'major federal action significantly affecting the human environment'."

Commenter 053

Response. The Department must examine the no-action alternative which, when compared to any alternative that includes the leasing option, results in an analysis to determine a need for leasing. The Department, therefore, chose to address this issue directly rather than indirectly.

11. **Comment.** "We find, as another shortcoming of the proposed program and the draft EIS, far too much emphasis placed on strip mining as opposed to underground mining. This is inconsistent with DOI's Coal Extraction Task Force recommendations that emphasis be placed on underground mining in order to minimize environmental and social impacts. The reasons cited by this group were: to avoid the serious environmental impacts of a large increase in strip mining; to concentrate on the vast majority of the available coal resources which are farther underground; to lower required production level due to the higher energy content of deeper coal; and to provide the smoother growth and sustained production associated with underground mining, as opposed to the boom-bust cycle associated with strip mining. The EIS should address the recommendations of this task force."

Commenter 085

Response. The conclusions drawn here are largely in error.

1. Underground mining has different but equally troublesome environmental impacts. The two greatest problems are the much greater number of people required to extract an equal amount of coal. This leads to greater socio-economic impacts, as well as environmental impacts from increased urbanization and general land use demands. In addition, human safety hazards associated with underground mining are much worse than those associated with surface mining.

2. Surface mines are no more prone to boom and bust than are underground mines.

12. **Comment.** "On page 3–18, Col. 1, the DES describes proposed planning rules and regulations by both the Forest Service and the BLM. However,

there is no discussion of how the two agencies will coordinate activities, or which agency will prevail in the event of conflict. There should be specific discussion of the Department of Interior's plans to avoid stalemates in areas of multiple agency control."

Commenter 094

Response. "A memorandum of understanding" is being negotiated between the Bureau of Land Management and the U.S. Forest Service for managing coal leases from Forest Service land. Relationships between the two agencies are clearly spelled out in the law (e.g., Section 3 of the Federal Coal Leasing Amendments Act of 1976); good relationships exist between the two agencies, and the Department does not expect that any managerial impasses will develop. When completed the memorandum of understanding will be available to anyone interested in the specific details of this relationship upon request to the Department.

13. **Comment.** "I am concerned about many of the economics-oriented policy questions, on such topics as bidding systems, allocated by statute to the Department of Energy, but for which coordinated working relationship of the two agencies must be strong in practice. The vague memorandum of understanding found in Appendix B of the Environmental Statement is no guarantee of performance. Interior established a rigorous schedule for itself and has held to it. It seems that Energy should do the same."

Commenter 147

Response. The Departments of Energy and the Interior will diligently work together, where necessary, to implement any decisions to which they must mutually agree.

14. **Comment.** "Our questions are:

-What effect will the proposed program have on development or production of these coal resources?

-To what extent have these coal resources been considered within the framework of a Federal Management Program?"

Commenter 031

Response. The effects of the proposed program are presented in Chapter 5. For more detail on coal resource consideration in existing MFP's, refer to Chapter 3.2.11.

15. **Comment.** "Para. 3.1.1. I recommend 2 points to be added to this Preferred Program:

a. Add an exchange authority to allow the Secretary to retain coal lands which may have other greater values.
b. Allow selective noncompetitive leasing to assure cheap coal supplies for local markets."

Commenters 019 and 135

Response. Lands with greater value for other resource features than coal recovery will be eliminated from leasing by unsuitability designations and resource trade-off planning decisions made during the initial land use planning stage of the preferred program. The Department is limited in how it may reobtain the mining rights to undersirable existing leases. It may do so only by offering compensation in the form of:

a. lease exchanges and fee land exchanges if the existing leases are in alluvial valley floors,
b. bidding rights,
c. lease modification, and
d. exchange for lease on another Federal leasable mineral.

The Department unsuccessfully sought generic exchange authority for undesirable coal leases during the last Congress. It presently lacks such exchange authority. Small amounts of non-competitive coal are available for local markets through the coal mining license feature described in the regulations (see Section 3440); the Federal Coal Leasing Amendments Act of 1976 otherwise removed the authority to sell Federal coal through noncompetitive leases.

16. **Comment.** "The preferred program should include provisions for denying federal leases to companies or individuals that are in violation of performance standards established under the Surface Mine Control and Reclamation Act of 1977."

Commenter 061

Response. Final SMCRA regulations which are implemented by the Office of Surface Mining, provide the appropriate enforcement.

17. **Comment.** "Wyoming has created many organs of State and Local Government which deal with various aspects of coal development. Where Wyoming has addressed these questions, I naturally oppose Federal actions which would pre-empt

or tend to abrogate functioning state and local authorities. By and large, the preferred alternative has successfully avoided these sorts of conflict. A number of examples illustrate the problem and the point.

"(1) The Land Quality Division of the Department of Environmental Quality has primary authority for mined land reclamation in Wyoming. It is possible for stipulations in BLM leases to infringe upon the determinations that are properly left to our state regulatory authority. The preferred alternative has consciously avoided this conflict.

"(2) Our Industrial Siting Council protects the health and welfare of Wyoming by operating permit procedures which thoroughly examine new energy facilities in Wyoming. Interior has proposed an investigation of its authority to regulate the end uses of coal, which might affect the powers of our state authority. The proposal is presently tabled for further study, and I hope that it will remain tabled indefinitely."

Commenter 147

Response. The Department will not propose actions contrary to the State's interest as expressed above.

18. **Comment.** "General. We consider the sections of the DES treating evaluations and assessments of regional environmental impacts to be comprehensive and of such quality and scope as to properly address all levels of potential leasing activity. We have serious concerns, however, about the Preferred Coal Management Program described in Chapter Three. In our judgment, this proposed program has several fundamental problems:

1. We are concerned that some of the laws upon which the program is based do not properly recognize the balance required by our nation's environmental, energy, and economic goal.
2. The land use planning system, as proposed, goes far beyond the President's intent regarding environmental protection, and seriously jeopardizes attainment of coal production goals.
3. The inherent uncertainties associated with utilizing long term projections of coal supply and demand to determine the need for leasing could result in underestimating the levels of leasing necessary to meet our nation's future coal requirements.
4. The potential consequences of a more centralized form of Federal coal management, the exclusion of industry input to the land use planning process, and the prospects of underleasing of needed coal resources on our nation's energy and economic goals have not been adequately addressed."

Commenter 084

Response. This comment is answered as follows:

1. Congress is responsible for the laws upon which the program is based. The Department acts on the assumption that these laws are the nation's goals.
2. The land use planning system is aimed at meeting the multiple-use goals of the nation, one of which is energy production. The Department anticipates meeting those goals within the framework of existing laws and the proposed land use planning and coal management program regulations.
3. All predictions of future demand are subject to reasonable question. The Department recognizes the need to maintain adequate supplies of coal available for development. The management system proposed would make coal available for leasing seven to 10 years ahead of anticipated production dates. Coal demand would be updated every two years. If additional needs were evident, new leasing would be initiated. In addition to these demand projections, the Department will be concerned with artificially high prices for coal and may lease coal to improve competition if the administration determines it is in the national interest. The Department will not act to constrain the national level of coal development. It may constrain development in local areas where it serves the local, state or national interest.
4. All interested parties, including industry, will be able to participate in the land use planning process. (See proposed BLM planning regulations, Federal Register, December 15, 1978.) Areas that are desirable for development can be identified by industry. However, no tracts will

be identified until the activity planning step. Text has been added in Chapter 3 to discuss industry's role in land use planning–a role which the Department hopes will be very active.

19. **Comment.** "With respect to the amount of federal coal which will ultimately be available under the preferred alternative for the Federal coal leasing program, it must be observed with deep regret but not with a great deal of surprise that the Department's present position is apparently that, if all the various government agencies to be directly involved in leasing cannot, among themselves, or by virtue of public comment think of *any* reason for excluding a tract of federal coal land from leasing, the tract in question might possibly then be considered for a lease sale. Some specific parts or characteristics of the preferred alternative which would seem to unnecessarily restrict the amount of federal coal available for leasing are:

1. Designation, by means not fully discussed and probably not quantifiable, of only those reserves of "medium and high potential" as available for leasing;
2. Apparent reliance on existing Known Recoverable Coal Resource Areas (KRCRAs) as defining the areas in which future federal coal leasing will be considered, even though the present KRCRAs include a very small portion of all of the Federal lands that are known to contain the coal resources; and
3. Implementation of no less than 24 separate unsuitability criteria for elimination of otherwise qualified Federal lands from any future consideration for leasing by what will apparently be a much more uncompromising application of such criteria than is mandated by law and which has been experienced in the past."

Commenter 066

Response. Congress has eliminated exploration for coal by private companies through the use of preference right lease applications. The proposed regulations do provide for private exploration of Federal coal (see subpart 3410). The Department has an active program which will, in time, define the nature of all Federal coal resources. Available manpower and budgets limit the amount of land use planning the Department can do in any given period; therefore, some limits must be in place on how much of the Federal lands will be reviewed for potential coal mining. The Department believes it is reasonable to limit its efforts to those areas where there are known coal resources of medium to high potential for development. These areas are described by procedures set out by the U.S. Geological Survey and are available upon request. Text has been added in Chapter 3 and provisions have been added in the proposed regulations to ensure those areas not already classified as having medium or high development potential can be considered if existing data or new data presented by industry or others indicate a reasonable probability of developable coal being present.

The unsuitability criteria are based on numerous statutes and clear environmental policies stated by Congress. The authority for these criteria are shown in a new table added to chapter 3.

20. **Comment.** "The DES states that under the preferred alternative, 'The principal coal resource decision in the land use plan would be the determination of which areas are acceptable for further consideration for coal leasing.'

"In fact, however, the process described as the preferred program consists of screening all federal lands through a series of successive reviews, the sole purpose of each of which is to preclude, on various grounds, any further consideration of the lands involved for federal coal development.

"The process itself, and the sequence of the decisions in the program, systematically gives precedence to all other articulated environmental social and natural resource development policies. Land management decisions would be required to be made in the absence of adequate information concerning the nature or desirability of federal coal resources. Indeed, the recognition of the relative importance of such resources in comparison with other competing environmental or social values is specifically precluded throughout this stage of the planning process."

"However, both industry and the Department might have a specific need for the coal involved in any given area: industry might require a lease to complete or obtain access to an otherwise undevelopable logical mining unit of federal or nonfederal coal, while the Department might determine that coal from a given area is required to fulfill one of its 'production targets' (see discussion,

below). In either case, throughout this process of elimination, there would be no opportunity to identify such specific need."

Commenter 098

Response. The preferred program consists of a series of screens which eliminate lands from further consideration for coal leasing. The first screen would eliminate all those lands which have no known coal resources or coal resources of low potential economic value. The second screen would be the application of unsuitability criteria. This screen would eliminate areas from consideration for the leasing that are protected by environmental statutes or policy. The third screen would be a multiple-use trade-off screen in which areas which may not be protected by the unsuitability criteria but have unique or strong local support for protection would be eliminated from consideration for leasing. We would expect that relatively small amounts of land would be permanently precluded from this step, but instead, the timing and amount of development that would occur would be controlled. The fourth screen would be applied as a result of the surface owner consultation. Recognition of the relative importance of coal resources with other competing environmental and social values would be specifically included in the multiple-use planning step. The leasing targets would be applied during the activity planning stage. It is assumed that sufficient areas will be available in the early years to meet these leasing targets. Should it be impossible to meet a leasing target in any specific region, the possibility and advisability of shifting that demand to another region would be studied. As the social and environmental values changed, however, additional coal resources may become available in the planning areas in question.

21. **Comment.** "Western recommends that the Department include a timetable for the planning tract identification/leasing/environmental assessment process, to include a guarantee for meeting this timetable. The proposed process appears awfully complicated and unwieldy, and the coal and utility industries would like some guarantee that this ambitious program will be carried out in a timely fashion."

Commenters 019 and 135

Response. The following timetable shows expected typical times to conduct the activities referred to in the ES:

Comprehensive land use planning	two-three years, with most of the activity occurring during the last year
Activity planning	18 - 24 months
Target setting	six-nine months
Tract sales	beginning one to two months after the Secretary's decision on the lease schedule and continuing over four years

It should be kept in mind, however, that these activities will be conducted in parallel, and it would be expected that if a need for coal leasing is determined in a region, there will be tracts coming up for sale within that region continuously.

22. **Comment.** "With respect to the various planning stages leading to a lease sale, (Fig. 3-1), there should be timetables projected for each identifiable step so that the total timetable could be incorporated into a development schedule for potential lease applicants, particularly for relatively new entrants such as Santa Fe. These timetables should then be further broken down to apply to the detailed process steps defined in Figs. 3-2, 3-3 and 3-4."

Commenter 096

Response. A general table indicating typical times needed to accomplish the major steps of the preferred program has been provided in response to another commenter. The details of the processes encompassed within these major steps was not developed sufficiently to be ready for publication with the final ES. These times are available from the final task force reports that will be completed for the Secretary's decision. Departmental representatives in State and District BLM Offices are always available to discuss with anyone interested the details of the coal management activities of the Department.

23. **Comment.** "Section 3.1.1 describes the general characteristics of the preferred alternative for the proposed federal coal leasing program. In general, this discussion should satisfy the requirements resulting from the decision *NRDC* v. *Hughes* that

any proposed federal coal leasing program be described in sufficient detail.

"There are, however, several points concerning this program which are disturbing to industry. First is the apparently inflexible requirement that all necessary land use planning involving the identification of coal lands, the application of the numerous unsuitability criteria and the nebulous resource trade-offs be completed before the activity planning stage can proceed which involves regional environmental impact statements. Considering the tens of millions of acres of land involved even if new coal leasing is restricted to existing KRCRAS, it is difficult to believe that the Department can maintain the schedule for resuming actual lease sales within eighteen months after the adoption of a coal leasing program. In fact, related land use planning efforts by the primary public land administrative agencies, the Bureau of Land Management and the Forest Service, concerning wilderness designation would seem to make it absolutely impossible to keep such a schedule. It is imperative in the preferred alternative be expanded to include specific assurances, with supporting illustrations that such a schedule can be accommodated."

Commenter 066

Response. The Department is directed to manage lands according to a comprehensive land use plan (FLPMA and FCLAA). The Federal Land Policy and Management Act validated all existing Federal land use plans. About 85 percent of the BLM administered land has such valid plans. The Department has proposed these plans be updated by applying the unsuitability criteria. Once this step is completed, activity planning can begin. The Department must strike a reasonable balance between developing all new land use plans under new planning regulations, which will take 10–15 years to complete, and issuing new leases under existing plans without any review. Section 3.2.8 describes the process the Department proposes to pursue. The Department is well aware of the demands that will be placed on the BLM. It should be noted that the Department cannot compromise the values protected by statute in order to expedite coal development, there is nothing magic about a goal to begin leasing in 18 months, and no such goal has been set. The Secretary must first reach a decision that there is a need for renewed leasing. If he does, contingency planning by the BLM has suggested that competitive leasing could resume within 12 to 18 months of the Secretary's decision.

24. **Comment.** "It should be expressly provided in the new program that those areas previously nominated under EMARS II, and those areas with respect to which specific indications of interest have been or may be received by the Department, shall automatically and on a priority basis be advanced through the land use planning process and subjected to review under the activity planning process.

"Moreover, we suggest that on a continuing basis the orderly development of the nation's coal resources would be best served by providing in all instances that the coal industry and all interested persons be afforded an opportunity to focus the attention of the Department upon particular land areas for consideration for division into tracts and offering for lease."

Commenter 098

Response. The Department has developed a planning process which will identify those areas that are suitable for consideration for leasing. At the beginning of the tract identification and evaluation phase of the process, coal industry and all other interested parties will be afforded an opportunity to focus the attention of the Department on particular land areas for consideration for division into tracts. At that time, areas previously nominated under EMARs II that are located in those areas determined to be suitable for consideration for leasing can be renominated by industry. No consideration will be given to the EMARs tracts prior to this step of the process.

25. **Comment.** "Lastly, we hope that the Department will evaluate ways in which to streamline and better integrate the coal permitting processes and incorporate such ideas into the final EIS. As you know, the current environmental review and regulatory processes at all levels of government are cumbersome, duplicative, wasteful, and overly time-consuming. Rather than improving our environmental understanding of a project, the existing fragmented approach has impaired our environmental awareness."

Commenter 155

Response. Lease stipulations, a central feature of the coal permit, logically follow from the coal leasing management program described in this

Environmental Statement. Paragraphs 3.2.4.2 and 3.3.9 described stipulations of a preliminary nature to assure the proposed lease would be economically and environmentally acceptable. As explained, the subsequent mine plan required of a lessee would involve more detailed and perhaps different stipulations. In large part, the coal permitting process is subsequent to the described management program, but early and continuing opportunities for public and industry participation provide for smooth integration of the management and permitting processes. In addition, the Department and representatives of the western coal states have investigated opportunities for greater administrative efficiency among the Federal and the various state coal management programs.

26. **Comment.** "Section 3.3.9 concerns the relative detail of stipulations for environmental protection which would be attached to a particular lease prior to sale and then to any mining plan submitted upon lands covered by that lease. The only comment on this procedure is that it would be a great disservice to the objectives of the coal leasing program if the stipulations attached to the mining plan were significantly different or more restrictive than those attached to the lease. A bidder for the lease has, in all fairness, a right to know that the mining plan stipulations will not be so different from the lease stipulations or from typical mining plan stipulations that a significant quantity of the coal he had expected to mine is rendered unminable."

Commenter 066

Response. The Department agrees.

27. **Comment.** "The first area of concern that we have is the initiation of an exchange and the timing of such a proposal. Specifically, who should initiate the fee coal exchange? Will the Department of the Interior, through the Bureau of Land Management's land use planning efforts, approach the fee coal owner and/or lessee concerning an exchange? Or will the fee coal owner and/or lessee have the burden of initiating the exchange?

"Our position is that both the fee coal owner and the fee coal lessee, as well as the BLM, should have the right to initiate coal exchange procedures. The fact that a fee coal owner or lessee initiates the procedures should not mean that they must automatically bear the cost of the exchange procedure.

"In conjunction with the above, the Department of the Interior has not made it clear in the draft EIS as to how the coal exchange program fits into the overall context of the 'preferred alternative' for the Federal Coal Management Program. For example, will the Federal coal available for exchange purposes be included in reaching final regional production targets under the Federal Coal Management Program? Will a BLM land use study be required prior to exchanging Federal coal under the Federal Coal Management Program? Will the Federal exchange coal be subject to regional tract ranking selection and scheduling similar to that for leased Federal coal? What role will the public have in any coal exchange program? Will the unsuitability criteria be applied to all lands proposed for exchange prior to such an exchange taking place? Would there be a maximum acreage limitation on the Federal exchange coal? Will there be any provision made for emergency exchange of fee coal within an alluvial valley floor when such an exchange is needed to meet the fee owner or lessee/operator's contractual commitments or other financial commitments? What role will the local and State governments play in the exchange program?

"Will the Department of Interior consult with other agencies such as the EPA, Department of Agriculture, etc. to determine if those agencies have any objections to the particular Federal coal tract to be exchanged for fee coal? These questions must be addressed in the final EIS in order to provide the Secretary of the Interior a complete picture of the impact of the proposed management program.

"Peter Kiewit Sons' position is that exchange coal should not be included in reaching final production targets for Federal coal deposits or for tract ranking of Federal coal. The rationale is that the Federal exchange coal is replacing fee coal that would not be subject to production targets and ranking for Federal coal. On the other hand, any land containing Federal exchange coal should undergo the unsuitability review in order to ensure that the exchange coal will be mineable. Furthermore, the Department must adopt procedures for emergency exchanges of AVF coal when such an exchange is necessary to meet the fee owner or lessee/operator's contractual or other finanacial commitments."

Commenter 100

Response. The administration of fee coal exchanges is now being studied by a Department task force with results expected by May, 1979. Your comments and suggestions will be passed along to this task force. You should also review the proposed regulations presented in Appendix A for answers to many of your questions. We agree that the exchange program should not affect regional coal target setting in so far as production potentials are the same: the tracts to be exchanged may well come from the tract ranking and selection process used for preparing new tracts for lease sale.

28. **Comment.** "There also appears to be an opportunity to create Regional Coal Advisory Panels for each of the 12 coal supply regions. These advisory panels would be similar to the Geothermal and Oil Shale Advisory Panels, and could provide a means for input into the program in each coal region by the public, industry, special interest groups, and state and local representatives. This would reaffirm the Departments' position that the preferred coal program be *continually* responsive to the interests of organizations and individuals."

Commenter 01 and 13

Response. Extensive participation has been structured into the Federal coal leasing process. While advisory panels have been useful in the case of oil shale development, we believe they would be of only marginal use in the case of coal management since coal management already includes very extensive participation and communication opportunities. The preferred program will include Federal-state regional teams with defined roles. These regional teams will guide the entire coal activity planning process.

29. **Comment.** "Since Friends of the Earth will present more detailed comments at other such hearings, my statement will address a narrow apparent inadequacy in the Federal Coal Leasing (sic) Draft Environmental Statement, this being the complete failure of the Statement and due process. Without question the resumption of federal coal leasing will stimulate industry activity, thereby placing an even greater strain on an already overwrought state enforcement process. Alternative methods for implementation of federal oversight and watchdog responsibilities under all relevant statutes must be described. It is rather obvious at my level of involvement that the present system is in some difficulty. Cady v. Morton, F.O.E. is now in the seventh year of our effort to ensure due process for the East Fork Sarpy Basin. Yet we may lose on a simple inability to post an enormous bond that a court might require before looking at the coming impasse that has been obvious for all those seven years and has often been brought to your attention. Such an eventuality would be a travesty of justice and proof that the general public can expect no chance at due process in the enforcement of coal mining statutes and regulations.

"There must be no resumption of federal coal leasing until the citizens are assured that the law will not continue to be taken as lightly as at present by some major parties to this process. The present Environmental Statement offers not the slightest hint that your office is aware there is a problem."

Commenter 181

Response. Enforcement and public participation concerns regarding mining and reclamation activities are more appropriately addressed to the Office of Surface Mining's permanent regulatory program. Due process and enforcement are detailed in OSM's regulations which are designed to handle vigorous coal development to meet the nation's future energy needs. The relationship of such activities and programs to the level of leasing determined to some degree by the alternative chosen in the coal management environmental statement is not sufficiently direct to merit the extensive coverage requested. It is anticipated that the program developed by OSM will fully protect the public interest, allow extensive participation and effective enforcement. Included in OSM's activity is full review of state enforcement offices, authorities and resources. A seperate,full environmental impact statement on the OSM permanent regulations has been prepared.

30. **Comment.** "Our fifth concern is that management program goals will not be achieved because of inadequate enforcement. The heart of the new management approach is mitigation of social, economic, and environmental impacts in one way or another. As we read current laws, if impacts cannot be mitigated adequately, then mining shall not occur. Land managers will attempt to screen tracts prior to offering leases for bid, but ultimate responsibility for mitigation must lie with the

purchaser. To enforce this responsibility we feel two new requirements are needed: the mine development plan submitted by the lease holder should include proposed measures to mitigate all anticipated social, economic, and environmental impacts (to include arranging for front money where necessary) with documentary evidence sufficient to support the reasonable conclusion that the proposed measures would be successful, and the prior record of a bidder or lease holder should be admissible for consideration by the land manager in deciding such matters as whether to accept or reject a bid, whether to approve a development plan, or whether to require the posting of a bond."

Commenter 042

Response. The GS and OSM or the state regulatory authority are responsible for enforcing the terms of the lease agreement. The Department is responsible for developing the lease stipulations. Such stipulations will require the mitigation prescribed by the FLPMA, SMCRA and other applicable Federal and state laws. Complete mitigation of all impacts is clearly not possible. There is no legal basis for requiring a company to provide "front money" for public services, and the Department will not recommend such action. Prior records of would-be bidders will not, generally speaking, be considered for qualifying bidders. All lessees are required to post performance and reclamation bonds.

31. **Comment.** "A programmatic impact statement represents a task unique in Federal policymaking. It imposes a nondiscretionary duty upon Federal officials to think in a certain way about discretionary acts. The programmatic impact statement is a vehicle for introducing human environmental values into the decisional process. It is designed to affect and inform that process from its earliest stages, yet is required to be made public, subjected to public scrutiny and comment, and to be responsive to public views. The programmatic impact statement requires an agency to consider values outside its mission at the very moment it develops the basic policies for carrying out its mission. It requires comprehensive analysis which ranges far outside the normal ambit of an agency's responsibility. For this reason the programmatic impact statement is unique and essential. It is virtually the only process for effectively addressing such broadscale human concerns."

Commenter 089

Response. Yes, we agree. The Department has responded to NRDC's concerns in its formal response to their letter to the Secretary (of February 15th, 1979) alleging possible violations of the *NRDC v Hughes* agreement. Unsuitability comments have been filed for consideration when the results of field tests are on hand - April or May, 1979.

32. **Comment.** "Far more comprehensively than its predecessor, the DES addresses critical issues. But the analyses begun are often left incomplete. Discrete topics are described but remain isolated, unconnected by analysis. The treatment of the need for leasing is critically deficient. The description of the environmental and other impacts which will result from the development of Federal coal is inadequate. Important issues, including the rehabilitation of mined lands, are treated only cursorily. The alternatives considered are not genuine alternatives, but rather fragments of alternatives."

Commenter 089

Response. We do not agree with most of this comment. Chapter 5 has been expanded to provide a more detailed discussion of the reclamation and rehabilitation issue.

33. **Comment.** "It is apparent that this draft impact statement, like the previous draft and final programmatic impact statements, fails to contain a 'detailed' explanation of the proposed preferred management program. While the number of pages devoted to explaining this program undoubtedly exceeds the number of such pages contained in either of its predecessors, it does not present a comprehensible and comprehensive picture of the manner in which coal leasing decisions will be made. Thus it effectively prevents readers from making an informed judgment regarding the degree to which this program will achieve the Department's expressed goals."

Commenter 089

Response. The comment is rather unbelievable in view of the great detail in Chapter 3 (both in the draft and in the expanded final). The example regulations presented as an appendix to the statement in the draft (now proposed regulations), and the widespread availability of background papers clearly explain the Department's goals.

Significantly the comment lacks any concrete examples of where problems do exist that interfere with an understandable program. Equally significant is that virtually all commentors were able to understand the program. We will continue to improve the clarity of the program as the Secretary decides what part or parts of the proposal he will adopt.

34. **Comment.** "As a consequence of our position that there are many substantive deficiencies in the proposed coal management program, and because the EIS recognizes that some existing leases and PRLAs are not acceptable for development, EPA believes that the Department's first priority should be toward fully developing the analyses of existing leases and PRLAs that are unsuitable for mining. We urge the Department to concentrate on using both the land use planning process and the activity planning phase to identify unsuitable existing leases and PRLAs. Any leasing in the near term should be oriented toward replacing those existing leases that are unsuitable for mining. The Department should then re-evaluate the need for additional leasing given such an exchange program."

Commenter 281

Response. The final ES incorporates extensive discussions of the management of existing leases and preference right lease applications in Chapter 3 and Appendix I. The Department looks to existing leases and to non-competitive leases issued as a result of preference right lease applications as sources for coal to meet regional production goals before it considers new leasing. The Department, under the preferred program, would use the land use process and the activity planning process to identify unsuitable existing leases and PRLAs, though, because of existing rights, the Department will have to consider these leases and applications on a case-by-case basis. Analysis of the regional levels of leasing would include consideration of the impact of unsuitability findings on existing leases and preference right lease applications. Finally, a consideration in the formulation of regional leasing targets is the need to identify mining units to support the exchange features of the coal management program. The Agency comment reflects a lack of understanding of the statutory limitations under which the Department must manage existing leases and PRLAs. There is no statutory authority for carrying out general coal lease exchanges on the public lands.

35. **Comment.** "Section 3.1.1: The Preferred Program. The seventh element of the preferred program, 'a strategy to integrate the environmental analysis requirements of the National Environmental Policy Act of 1969 in the new program', is extremely important. It is impossible for national and regional leasing programs to adequately analyze site-specific impacts or recommend appropriate mitigation measures. There must be a mechanism for identifying and solving site-specific problems on a site-specific basis."

Commenter 266

Response. The program provides several opportunities for conducting site specific analyses. Each step in the process is at an increasing level of specificity. The program, thus, clearly provides for adequate analysis of site specific impacts. Site specific analysis will first occur during the preliminary tract analysis step immediately following tract delineation. There is an additional opportunity for site specific analysis together with regional cumulative analysis during the selection of the regional sales schedule; in this process, some tracts might be scheduled late in the four-year sale period covered by the schedule to allow additional data to be gathered on them or might be entered in the schedule on a contingency basis subject to additional pre-sale analysis results. Finally, site specific analysis will be carried out under the Surface Mining Reclamation and Enforcement regulations as part of the mining permit process.

36. **Comment.** "Chapter 3 creates a significant misapprehension that the Forest Service has the statutory authority and responsibility to plan for the disposal of coal. We believe any such connotation should be removed from the text in publishing the Final Environmental Impact Statement, and that such authority and responsibility be recognized as a function of the BLM.

"The problem starts to surface in *Section 3.1.1.1 Planning Systems* with the statement that the Department of the Interior would rely on the land management agencies' planning systems in both the land use and activity planning stages to provide the initiative and the forums for decision making regarding the Federal coal program.

"In the discussion under *Section 3.2.2 Activity Planning,* it states that, on completion of the land

use plan, preliminary tracts would be identified within the areas designated acceptable for coal mining. In delineating the tracts, the *land management agencies* would consider such items as:

(a) technical coal data, including reserve tonnage, sulphur content, etc.;

(b) coal conservation, including maximum economic recovery, etc.;

(c) expression of coal mining interests on adjoining lands, etc.;

(d) surface ownerships, including terms of private surface owner consent, etc.

In essence, BLM's activity plans are analogous to Forest Service functional plans. However, we know of no Forest Service authority, under either the old or new planning concepts, which would allow planning for disposal of a specific mineral resource other than common varieties, such as sand and gravel.

"The Federal Coal Leasing Amendments Act of 1976 contains a mandate that the Secretary of Agriculture take into consideration any proposed coal development in 'comprehensive land use plans'." It further states that the Secretary of Agriculture shall include an assessment of the amount of coal, identifying the amount which is recoverable by deep mining, and the amount recoverable by surface mining operations.

"We perceive these requirements will be met in the process of developing the multi-functional Forest plan. Forest planning will also be the forum in which lands suitable for coal mining are identified, as well as giving broad consideration to the impacts from such activity."

Commenter 282

Response. Should reorganization occur, this comment could become moot; however, the necessary changes have been made in the final environmental impact statement. The roles of the Forest Service and the Bureau of Land Management in managing coal under the National Forest System lands will be set out in a memorandum of understanding between these agencies now under negotiation.

37. **Comment.** "(Page 3–6) The FES should address the question of how mining plan reviews fit into the processing of preference right lease application associated with existing leases."

Commenter 091

Response. The coal management program has not set a policy on this subject. The question should be raised again in connection with the MOU to be negotiated among BLM, GS, and OSM on coal management.

38. **Comment.** "(Page 3–5) *Mine Plan Approval.* Material in section 3.1.1.4 implies a State could approve a mining plan without Departmental approval. To correct this we suggest deleting the words '... the State agency or' from the third sentence so that it would read, 'To obtain the permit, the lessee would be required to have a mining plan approved by the Department if a plan has not been previously approved or requires change, the new plan must be included in the permit application'."

Commenter 091

Response. The implication that a state could approve a mining plan on Federal lands without Departmental approval is not correct. This is a shared responsibility (see section 741.4 of the OSM, Permanent Regulatory Program, 44 Federal Register 15311–15463).

39. **Comment.** "(Page 3–5) With regard to production target, the DES states that 'the Department would review and, if necessary, adjust the portion of the national targets which applies to the eight regions containing Federal coal.' The FES should provide an expanded discussion of what is actually involved in the review and adjustment function".

Commenter: 091

Response. Chapter 3 in the final statement contains a more detailed discussion of how the regional production goals and leasing targets are set.

40. **Comment.** "(Page 3–2) What criteria will be used in the inter-regional analysis to determine regional production targets?"

Commenter: 091

Response. The criteria considered in determining targets from DOE's production goals are:

1. Industry need
2. Environmental impacts
3. State and local gov't policy
4. Public comment

41. **Comment.** "(Page 3-25) In Section 3.2.4.2, the DES states that the Department would conduct an environmental analysis for each proposed lease to develop lease terms and stipulations so that the

Department could be reasonably certain that the lease would be environmentally acceptable. What would be the extent of this environmental analysis? Does it appear that a site-specific mining plan environmental statement would later be required?"

Commenter :091

Response. The Department intends that the environmental analyses will be to a depth at which the Department can be reasonably certain of no unexpected environmental impacts after leasing. We intend as much as possible to consolidate the environmental analysis of the Federal LMU with that of the mining permit and reclamation permit process in our analyses prior to leasing and to seek all means of making these processes compatible. Even so, however, it would be expected that ESs will be needed for a few mining permit approvals because of the limits of our resources available for preleasing analysis and because of changing circumstances.

42. **Comment.** "(Page 3-36) Would all pending mining and reclamation plan approval actions be included in the regional leasing environmental statements?"

Commenter :091

Response. Our intention would be to include these plans in the regional ES wherever possible.

43. **Comment.** "*Preleasing.* A principal theme of the preferred alternative is the determination *prior to leasing,* that a specific tract can, with reasonable certainty, be developed in an environmentally acceptable manner. If such a determination is to take place prior to leasing, detailed baseline data must be used together with "red-flag" criteria (or levels) for possible non-achievement of the performance standards of SMCRA (e.g., restoration to equal or better land use, restoration of approximate original contour, and protection of the hydrologic balance). The red-flag levels might be developed, for example, with respect to the sensitivity of surface and ground water to degradation; topsoil availability; vegetative cover and species; and wildlife habitat."

Commenter: 091

Response. OSM will be asked to be one of the "expert" agencies participating in the ranking and selection processes, including review of the tract profile analysis for flagging special OSM concerns.

ALTERNATIVES

1. **Comment.** "I think another thing—and this is sort of the alternative that I would opt for—is that we need to be looking at a combination of the alternatives that you have there, that instead of just saying we want the preferred alternative or we want short-term criteria or no leasing, that instead you ought to be looking at different ways you might try to pull this all together."

Commenters 148, 130, 058, 135, 019, 195, 060, 145, 107, 108, 123, and 089

Response. The Department, after analyzing the various issues associated with Federal coal management, has proposed a full range of options that cover all reasonable alternatives available. As shown from the summary in Chapter 3, the preferred program is composed of numerous elements, each of which may or may not be part of the final program.

2. **Comment.** "Section 3.1.1.8 describes how an emergency leasing system to maintain existing mines or to permit the mining of otherwise bypassed federal coal would be coordinated with the broader Federal coal leasing program proposed. The purpose of this emergency leasing program is to respond quickly enough to situations in which a broader long range leasing program would result in the loss of coal or employment unfairly. However, it is apparent from reading this section that since the emergency program could not proceed until the complete land use planning stage is finished, that such "emergency" leasing would, for at least the next few years, offer no relief to coal operators who would otherwise be in a position to benefit, and to benefit the government, by mining coal that might otherwise be lost. The need for such comprehensive land use planning before such emergency leasing, which is certainly going to be on a very limited basis either in terms of the acreage in any particular lease or the cumulative effect in any region, would seem to be unjustified. It should be enough that if the emergency lease is not clearly in conflict with the likely land use scheme for the area that the lease could proceed without such crippling delay."

"The insistence that an environmental assessment be made for each such emergency lease, presumably with a public hearing requirement and resulting delays, is likewise unjustified. It would seem from the discussion of emergency leasing

under the preferred alternative that such a system would completely replace any emergency leasing which is not now permitted under the settlement agreement in *NRDC v. Hughes.* Serious consideration ought to be given to preserving that portion of the settlement agreement which now permits such emergency leasing rather than redoing essentially the same program in the form of a component of the long-term coal leasing program."

Commenters 066, 059, 073, and 184

Response. Emergency leasing would conform with existing land use plans as updated by the application of unsuitability criteria. The emergency leases will not require redoing land use plans under the new proposed planning regulations (see Section 3425.2 of the proposed regulations); analysis will be conducted on a site-specific basis. Using this method, the BLM will be able to respond quickly to emergency needs. The proposed regulations on emergency leases have expanded on the existing *Hughes* standards for short-term leasing.

3. **Comment.** "In section 3.1.1 and 3.1.1.6 of the DEIS a discussion is had of the interrelationship of the preferred program for federal coal leasing with the processing of PRLAs and lease issuance. A much fuller discussion of PRLA treatment must be included in the FEIS which would consider, *inter alia,* the application of environmental and planning standards to PRLAs, the procedure to be followed if preference right lease issuance for a specific lease is opposed by the Department and the legal basis for any non-issuance of a preference right lease. Part 3430 of the example regulations, Appendix A to the DEIS, are of some assistance, but they do not fully delineate the impact of this treatment of PRLAs.

It is Western Fuels' understanding that these regulations are not yet proposed. When and if they are proposed, Western Fuels will comment fully upon them."

Commenters 090, 083, 013, 108, 112, 066, 098, 145, and 095

Response. The description of the management of preference right lease applications has been revised and expanded with a new section in Chapter 3 and a new appendix (Appendix I) to make the Department's intentions with regard to this large class of possible coal leases clearer. Environmental and planning standards will be applied to the PRLAs during general land use planning or planning amendments; if a preference right lease holder successfully makes final showing of commercial quantity and the Department still opposes the issuance of the lease because of general planning considerations, the Department may enter into negotiations for exchanging the non-competitive lease for another lease if possible and where permitted by law or for other consideration.

4. **Comment.** "Mobil particularly objects to DOI's attempt in the preferred program to subject existing leases and preference right lease applications (PRLAs) to the same standards as new Federal leases. The preferred program would accomplish an unauthorized change in the meaning of "commercial quantities" in connection with existing PRLAs and would also retroactively affect existing lease rights. Existing lease and PRLA rights cannot be changed by the rules developed for new leases without raising serious legal problems."

Commenter 083

Response. The Department recognizes that preference right lease applications and existing leases have a special standing in the law (see Appendix I). The comment raises only general objections to the aspect of the preferred program; it does not give any specific examples, or any supporting rationale for its views. It is somewhat difficult, therefore, to respond to the comment. We will respond to more detailed comments submitted on the proposed rules and offer the following general response at this time.

Existing Leases. The most important point is that the "unsuitability criteria" do not all have the same statutory source; they come from a variety of laws, executive orders and general rulemaking power. Some are derived from statutes passed 10 or more years ago. Other are derived from section 522(e) of SMCRA and impose restrictions which the Department must enforce. The second most important point is that the Department's authority to apply some criteria may depend on the particular lease involved. Most lessees have agreed to be bound by subsequently enacted regulations; some have not. Particularly in the case of discretionary standards, the lease terms may decide whether the Department has the authority to apply the proposed conditions. The third important point

is that *none* of these past standards would apply to producing leases and that leases for which there have been substantial legal and financial committments are substantially exempt from the standards. Suggestions on how to better clarify these points in the final rules are encouraged.

Noncompetitive (Preference Right) Lease Applications. The application of the unsuitability criteria is not a change in the "commercial quantities" standard. Section 30 of the Mineral Leasing Act requires the Department to set lease terms to protect the public interest. The Department has a long-standing practice and case law of exercising its authority to set different lease terms for a noncompetitive (preference right) lease than it might have used at the time the prospecting permit was issued. The unsuitability criteria are nothing more than a lease term that the Department, in accordance with Section 30 of the Mineral Leasing Act, is imposing to protect the public interest. The filing of a preference right lease application does not prevent the Department from exercising its authority to impose lease terms that protect the public interest. This principle applies not only to unsuitability standards but also to conditions affecting rent, royalities and diligent development.

LAND USE PLANNING

1. **Comment.** "The document often confuses the need for resource management with the need for leasing. It ignores or shortchanges several management issues not directly related to new leasing. Coal policy seems to be outrunning resource policy and the implementation of adequate land use tools."

Commenters 156, 069, 019, 135, 130, 098, 159, 200, 068, 194, 101, 148, 178, 060, 083, and 137

Response. The ES clearly sets out, and differentiates between multiple resource management (land use planning) and coal resource management (activity planning). The discussion of land use planning in the final ES has been re-edited for clarity. Coal management and the Department's other resource responsibilities, e.g., land use planning program, wilderness reserves, grazing ESs, surface mining protection, and endangered species protection, are being coordinated. The coal management program review has included participation from all Bureaus and offices with the Department having potential to play important roles in the final program. Both FLPMA and the Forest Services' Organic Act, specifically, allow the use of existing land use plans in the interim until new plans prepared under the Acts' standards are available. In this way the Congress expressed clearly the need to avoid paralyzing this Nation's resource management program while the new planning systems were being put in place. This issue is discussed fully in section 5.4 of the impact statement, which reviews the alternatives of using existing plans as is; using the existing plans with modifications (the preferred alternative); and delaying all cost activities of the Department until new plans were available.

2. **Comment.** "The principal weakness of the discussion on land-use planning is the absence of definition concerning the screening process for coal leasing. There is no serious misunderstanding about lands not containing coal reserves with 'high to moderate development potential' or lands declared unsuitable for leasing under the provisions of SMCRA, though we have serious reservations about the latter. However, the statement that areas which 'are considered to be of higher value for other uses as determined by multiple-use, resource management trade-off decisions' would be eliminated from further consideration for leasing does not provide an understanding of either the criteria or the mechanism by which comparative land-use values are to be judged. Clearly, economic considerations are not prominent in the trade-off, since much of the Federal land containing coal has no other potential use rivaling coal development on economic grounds. Hence, the 'higher value' must refer to environmental, social, or aesthetic considerations which are not spelled out in the DES."

Commenter 069

Response. Resource management decisions are necessarily subjective, because all public land values cannot be reduced by one common denominator such as economic return. The proposed rulemaking for BLM planning regulations published in the Federal Register on on December 15, 1978 reveals the methodology that will be used in making resource use decisions. Section 1601.0-8 explains the principles of planning to be followed. In part 5 Response Management Planning Process, the various actions taken in a planning effort are described. The Department has received many

recommendations that it prescribe specific values for various resources beyond those defined by law. This is generally viewed as a method to gain control over the resource without judging its value relative to other associated resources on a site by site basis. If we assume seven resource uses— minerals, timber, watershed, recreation, wildlife, grazing and lands— we can construct 5,040 possible rankings. The Department does not believe that the selection of one of these 5,040 possibilities would result in good land use for all federal lands.

3. **Comment.** "The Secretary's preferred coal leasing program ignores the possibility that Federal coal may occupy a minority (perhaps insignificant) position in some attractive coal mining areas.

"Hopefully, isolated tracts of federal coal can be included in an LMU and be mined in the public interest."

Commenter 074

Response. The tract identification process will consider state and privately-owned coal where that coal is available for mining in forming LMUs. The industry indications of leasing interest and the close cooperation of the states in the tract delineation, ranking, and selection process should facilitate our ability to offer coal to complete LMUs and to time lease sales with private and state coal lands actions.

4. **Comment.** "Chapter 3 discusses alternatives briefly and the proposed program in detail. Several problems are inherent in the preferred alternative:

"1) The federal land use planning process is indefinite at this time, since proposed BLM planning rules are in a draft state. The planning process is a very important step in Federal coal leasing. It is therefore imperative that well defined and formally adopted regulations be provided and discussed in the DES. It is irresponsible to state that 'the land management agencies' planning efforts...are to provide the initiative and forums for making of the principal decisions in the Federal coal management program' when the mechanics of these planning efforts are in limbo.

"All areas to be considered for possible coal leasing should be subject to the new planning process rather than based on results of the old process. The DES states that proposed differences in the planning process (BLM) are designed to *substantially* improve the quality of land use plans. This implies that existing plans are not nearly as good as new plans could be. A land resource decision as significant as coal leasing should not be based on the lower quality existing land use plans. Decisions should be postponed until new plans are available."

Commenters 038, 061, 071, 147, 148, 156, 158 and 173

Response. Proposed regulations have been published for the new BLM and Forest Service planning systems. Because of this and because of our day-to-day working relationship with the managers of the BLM planning system and their involvment in the coal management review, we can see no difficulty in continuing to further define these two processes in parallel. We do not believe that it is good public policy to delay the possible year for coal leasing by four years at a minimum while waiting for new plans to be prepared. Existing plans would be supplemented to meet the requirements of the coal program should the Secretary decide to proceed with the leasing of coal from any particular region. The decisions on which plans will be reissued first are not based on which plans have coal leasing, but on a balance of the many other resource management concerns pending before the Bureau of Land Management at this time. Both FLPMA and the National Forest Mangement Act permit the use of existing plans until new plans are available in order to avoid management paralysis. This is a clear indication that the Congress did not intend to freeze all resource decisions, including those on coal, until they could be made in the context of a "new" plan. This issue is fully discussed in Section 5.4 of the final ES.

5. **Comment.** "The lands unsuitability criteria are a joke since exceptions are listed for virtually every criterion. It is not in the interest of sound land use planning to make exceptions for everything. Definite plans for evaluating unsuitable lands should be included in the planning process. It is stated that "a responsible official would make his recommendations on the best available data that can be obtained given the time and resources available to prepare the land use plan". This is utterly ridiculous. The land use planning process should be designed to include methodologies to provide for a sound evaluation of unsuitable lands in a timely manner. Too many Federal decisions in

the past have been based on "best available data ... given the time" with less than desirable results."

Commenters 038, 061, 071, 147, 148, 156, 158, and 173

Response. The Department believes that the use of exceptions with unsuitability criteria will ensure a better program and one that is more adaptable to individual situations. We have structured the use of exceptions so as to discourage anyone that would abuse them. Similarly, the local land managers have been instructed to continue lands in the system about which they may be unsure only if they provide for the collection of data and its analysis in order to remove this doubt. Until the BLM office is reasonably sure of its unsuitability findings for that area the area will not be leased. The tract ranking system is also set up to screen out areas with poor data coverage.

6. **Comment.** "Of the many questions raised during review of this DES, the emergency leasing system (page 3–27) is of particular concern. It is very poorly defined. How and when is it determined that emergency leasing conditions exist? How will the method of tract identification differ from normal and how would the scope and breadth of planning and environmental assessment differ from normal? When the applicant (company) shows coal is needed to sustain or increase production levels, will production be correlated to the need for coal? ... or to the need for profit? In view of the limited information provided on emergency leasing, it would appear that this is a 'quick and dirty' technique, so to speak, for companies to either get around the normal leasing process, or to avoid proper planning, or to make up for lack of foresight."

Commenter 038, 061, 071, 147, 148, 156, 158, and 173

Response. Emergency leasing would be conducted after petition for relief by a mine operator. In numerous places in the DES the Department has stated its policy that emergency leasing would not be used to circumvent the normal leasing process. Planning and environmental assessment would be conducted on a site specific basis with reference back to the unit plan for the area in which the emergency lease is proposed. Emergency leases would not usually be judged against the regional coal target because of their size and because their effect would be to continue rather than to add to production. The general aggregate level of emergency leasing would, however, be considered in forming the regional leasing target.

7. **Comment.** "The statement is made that, 'The Department would rank all available tracts within a production region'. Again, no criteria are provided for ranking tracts. The preceding paragraph on that page indicates that preliminary tracts, once identified, would be analyzed for 'the potential environmental impacts related to each tract.' But no indication is given as to whether environmental criteria are to be solely determinant in the ranking process, or whether factors such as quality, quantity, and accessibility of the coal will also be used in comparing and ranking potential lease tracts. We believe that the description of the proposed process should be amplified to include details about the methods by which potential lease tracts will be ranked and selected."

Commenters 159, 069, 148, 098, and 097

Response. The Department is in the process of further defining the tract ranking process. One element that will be considered is quality, quantity and accessibility of coal. This process is more fully explained in the final ES and the proposed coal management regulations (Appendix A).

8. **Comment.** "Although the DES is somewhat confusing in describing the proposed system, it seems to provide for the comparative analyses of tracts on the basis of the amount bid per ton of coal with some weight given for differences in coal quality. However, it does not account for differences in environmental circumstances or differences in the cost of extraction, processing, transportation recovery of the coal and reclamation, since detailed engineering will not have occurred until after lease issuance. As a result, no true comparison between tracts is possible prior to leasing. Moreover, the system does not take into account the requirements of leasing to form logical mining units where certain elements of a prospective unit are already subject to lease."

Commenters 087, 069, and 096

Response. The Department recognizes that the intertract system cannot be run on a simple dollar-per-ton basis. At the same time it believes that an intertract system can be a good means for ensuring the government competition in coal sales. The Department will, however, continue to proceed with caution in the use of this untried approach to

mineral lease sales. All intertract sales will be of leases within logical mining units. The last logical mining unit sale will be that which meets or exceeds the total volume goal for that sale, assuming all offers are at or above.

The tract ranking and selection process would take into account differences in environmental circumstances, both among individual tracts and cumulatively for different groupings of tracts. The principal attention at this stage in the process will be on impacts on regional air and water quality. The relative economics of the proposed tracts and their socioeconomic impacts are the other major ranking factors. The Department feels that it will know enough about the proposed tracts at this stage to make valid ranking judgments. It is not necessary to wait for the mine plan to be submitted by the lesser before conducting analyses that would allow tracts to be sorted as acceptable, not acceptable, or borderline for sales.

9. **Comment.** "Section 3.2.2.1-Tract Identification and Industry Expression of Interest, discusses the designation of coal tracts for lease based on factors including technical coal data. In the absence of prospecting permits, there would be a lack of complete reserve data. Section 3.2.2.2-Regional Tract Ranking, Selection, and Scheduling, also discusses the possibility of this technical data insufficiency, but does not propose positive action to remedy the problem.

"The lack of sufficient technical data could be remedied by a means of awarding prospecting permits to Industry operators, thereby permitting more meaningful tract recommendations to be submitted."

Commenter 094

Response. The prospecting permit program was ended when the Congress in 1976 prohibited non-competitive leasing. Private developers may still enter on Federal coal lands for obtaining technical data on coal resources by using coal exploration licenses, see subpart 3410 of the proposed regulations (Appendix A). The Department expects that coal companies will, therefore, still be able to obtain the information they desire on coal deposits in advance of leasing through the exploration program and in many areas through exploration on adjoining private coal deposits. The U.S. Geological Survey is another source for the coal data required by the preferred program.

10. **Comment.** "The statement is made that 'site-specific analysis of each tract would be conducted *prior to ranking* and an examination would be made for each selected tract to develop lease stipulations if necessary' (emphasis added) (page 6–3, column two, second paragraph). Given the level of protection afforded by SMCRA in setting mine permit requirements, and the fact that many of the 'ranked' tracts may not be finally offered for lease, detailed analysis, prior to ranking, may be a waste of federal resources. At that stage, much of the work will be of no consequence and will unnecessarily contribute to a monumental workload problem for the agencies involved."

Commenter 069

Response. The OSM regulations are primarily concerned with protecting site specific values and insuring complete reclamation. The tract ranking process is concerned with determining the relative values of several tracts and the potential impacts the development of those tracts might have on adjacent areas. The Department would not attempt to answer all the questions that must be answered before permit approval at the ranking step. Where answers were efficiently, and easily attained, however, they would be sought. Of prime concern are the cumulative impacts of developing several tracts in the same planning unit or production region.

11. **Comment.** "While Section 3.2.2.2 does indicate that comments will be sought on the relative merits of individual tracts under consideration for leasing, there is little indication of the weight to be given to various tract characteristics (i.e., low sulfur content vs. wildlife habitat)."

Commenter 069

Response. Under the preferred program the weights used to combine factors for judging the relative worth of different tracts, and the factors themselves, will be chosen by the regional coal teams. These weights can be adapted to regional value structures and to changes in the relative importance of the values over time. The factors will be chosen from a list of possible factors prepared by the Department. The ranking system will be used to broadly classify the acceptability of the tracts for further development.

12. **Comment.** "The process of ranking potential tracts on a regionwide basis 'and not separately within each land use planning area,'

assumes that all land-use planning areas within the region have completed plans, with all the required NEPA statements, etc. Ranking and comparing tracts in a region is relatively meaningless if significant numbers of tracts (not otherwise declared unsuitable) are unavailable because the planning is incomplete or inadequate. An early indication of market interest could be used to help schedule planning activities on the public lands. The preferred alternative precludes such indications until well *after* planning is presumed complete."

Commenter 069

Response. The Department does not anticipate delays as a result of incomplete planning. Approximately 85 percent of BLM lands have approved plans. Under the start-up considerations proposed by the Department, these plans would be updated by applying the unsuitability criteria. After completion of this process, tract identification and ranking could begin. Ranking of tracts from various planning areas in coal, even if not from all planning areas because of planning constraints, would still provide a better method of selecting tracts with less adverse impacts, particularly socioeconomic impacts, than simply selecting tracts from individual planning areas with no comparison between areas at all.

13. **Comment.** "The preferred program contains no procedure under which a potential lessee can obtain consideration of specific tracts of federal land that may be essential to its operations on adjacent lands.

"The necessary federal land may never even be available because it conflicts with other land uses for which there are many acceptable alternative sites, because it is considered unsuitable for mining under a number of questionable criteria, because it is arbitrarily set aside for leasing by public bodies or small business or because DOI's leasing goals have already been satisfied in the applicable region. Even the proposed emergency leasing system will provide little relief if the potential lessee cannot conclusively show that its need for the land resulted from circumstances beyond its control or which it could not reasonable foresee."

Commenters 083 and 069

Response. We disagree. There are numerous procedures in the preferred program to permit potential lessees to obtain tracts of particular interest. Potential lessees are expected to participate actively in land use planning–showing why areas have medium or high coal potential, providing data to show exceptions to unsuitability criteria, and arguing for coal leasing over alternative uses. In activity planning, a company can and is expected to specifically submit its desired tracts. The unsuitability criteria are based on statute and national policy and are not considered questionable. Federal coal will not be leased contrary to the unsuitability criteria, comprehensive land use plans or in areas where projections indicate no demand.

The Department does not foresee the potential for conflict between public bodies, small business and other coal developers. These set asides are required or authorized by law. The system is designed to meet all reasonable demands. Although the clearly dominant interest of Federal land management is to protect the public interest, which ranges from wilderness designation to coal mining, activities of private interests on the public lands are considered and encouraged where they are compatible with this primary goal.

14. **Comment.** "Regional Tract Ranking. Section 3.2.2.2 of the DES contains the criteria to be used by land-use planners in the regional tract ranking and selection process. We submit that, in addition to the elements stated, such factors as the end-use of the coal, the existence of a firm commitment for a project, and the time-frame for use of the resource should be considered in the ranking and selection process. In addition, we feel that no discrimination should be made between Federal and non-Federal surface ownership, if the private surface owner has given his written consent to surface mining of the Federal coal underlying his tract.

"Finally, we understand that the three-man team which will rate the tracts and recommend to the Secretary the tracts proposed for sale will include a representative that will be selected if the region covers more than one State."

Commenter 96

Response. The relative commercial viability of Federal coal deposits would be a factor in the ranking and selection of Federal coal tracts. Also, industry indications of interest, which would include the desired coal location and quality descriptions, would be very important in the

selection of which tracts to lease. The Department would not commit coal deposits to any particular private development project in advance of sale except for coal lease modifications, since we must offer all coal competitively. The Secretary has decided that it is to the government's advantage to offer coal under Federal surface before offering coal underlying private surface–other things being equal. In making this decision, the Secretary had in mind avoiding disruption of private enterprises and ensuring the competitiveness of lease offerings. The regional decision teams would have one representative from each State Governor and one from each state BLM office in the region, plus an additional member appointed by the Director, BLM, who would serve as chairman.

15. **Comment.** "Regional Tract Ranking, Selection and Scheduling (DES; 3.2.22). The proposal to rank federal coal lands acceptable for further leasing consideration for mining would appear to insure the maximum production and most efficient leasing of 'priority' coal lands. Priority would be determined as either low, medium or high in rank. Although not specified in the DES, it implies that all economic factors including transportation, coal quality, and market needs would be analyzed along with environmental and multiple use trade-off considerations in the ranking process.

"Two serious faults in the DES ranking process exist. First, the process is not clearly outlined. No indication is given as to how the criteria, other than surface owner consent, would be applied and to what degree each would count towards the final decision. Economics should be a key factor. Maximum economic recovery and fair market value of the lands result from considerations of mineability and profitability. Profitability of a tract is determined on the basis of detailed mine planning and market availability. Without significant geologic knowledge of the coal deposits and mine planning, the maximum recovery potential of a tract in terms of profit can not be accurately determined.

"Second, a tract considered to be low ranking in terms of quality, its thermal value, transportation or economic recovery could quite easily become high ranking due to sudden changes in utility or other industry plant siting capabilities and market needs. Currently, the preferred leasing program would be unable to react to these market changes without significant time losses from re-evaluation of tract rankings and potentially lengthy legal delays in preparation and acceptence of an environmental impact statement. These delays in time would all contribute to increased costs of plant construction and mine development and would mean the difference as far as the attractiveness of the tracts' resources versus other more costly fuel sources.

"Northern recommends the system of free enterprise and competition be allowed to determine tract value and ranking. Also, that economic recovery must be based on sound economic principles of evaluation and mine design without imposing probable undue economic constraints upon unleased tracts and mining companies which are ultimately revealed in the form of higher costs of production and use."

Commenter 073

Response. As the Department proceeds through the planning process, the economic values of the coal assume greater importance. These economic values would become very important factors in the tract ranking step. The Department expects industry to play a key role in this step of the planning process. This entire process is explained in greater detail in the proposed regulations (see Appendix A). The Department would review the activity plans every two years and plan sales in any given area every four years. Regulations allow emergency leasing at anytime. These provisions should make it possible for the Department to respond to changing market conditions. An industry-nominations system such as EMARS would not have the capability to respond to radical market changes more quickly than the preferred alternatives since new nominations and analysis would have to be done prior to leasing. Contrary to the comment, tract ranking and selection should not be based solely on economics. The degree of environmental and socioeconomic impacts must also be considered. Free enterprise and competition alone would not provide this critically important aspect of lease sale decisionmaking.

16. **Comment.** "Earlier in Chapter 3, page 4, it is stated that *boundaries* or preliminary tracts would be established on the basis of coal data. However, there is no indication that any of these criteria, especially surface ownership patterns, would play a

role in actually ranking tracts, once their boundaries are determined. We believe the EIS is seriously deficient because of this omission."

Commenter 159

Response. The Department is in the process of further defining the tract ranking process. Coal geology will be the major basis for preliminary tract delineation. Surface ownership patterns will however, have a significant impact on how tracts are delineated and ranked since ownership affects the competitiveness of proposed tracts and the Department desires to define preliminary logical mining units that are as competitive as possible. The Department's intention is to avoid as much as possible situations in which the LMU ownership pattern discourages bidders from participating in a lease sale. As noted in the final EIS, the Department prefers to avoid leasing in areas of split ownership.

17. **Comment.** "A related point is the threshold analysis concept mentioned in the statement. This concept is exciting to us, but we are confused as to how, when and where it will be employed as an analytical tool. For example, if adverse community conditions can be forecast under one level of coal development, is there a lower level which is acceptable? The same analytical approach could be applied to meeting air or water quality standards. We believe the concept needs further discussion."

Commenters 155, 066, 060, 145, 148, 160, 037, 030, 061, 057, 097, 118, 105, 108, 124, 076 and 281.

Response. The Department has begun a special effort aimed at further analyzing the threshold concept. Provisions based on this analysis will be included in the BLM planning regulations scheduled to be published in final form in June, 1979.

18. **Comment.** "The Programmatic in Section 3.2.1.4 offers the remedy that many decisions may be oriented more toward impacts dependent on levels or rates of development. Threshold development levels may be used to limit the amount of Federal coal leasing to levels which a community or area is able to support.' This is certainly a fine idea, but nowhere is there any requirement that it be adopted. I urge that threshold development levels be a mandatory part of the planning process. The BLM should determine acceptable levels of coal development for each region and area within the region and refuse to permit development that would be socially and economically excessively disruptive. Without this requirement, we have no assurance of protection for our families against skyrocketing crime rates, overcrowded schools, unrepaired roads and polluted air and water."

Commenter 164

Response. The Assistant Secretary, Land and Water Resources, has asked the Director, BLM, by memorandum, to further study the threshold concept and include a requirement in the final BLM planning regulations that consideration of its use be a required aspect of land use planning. The threshold concept is not expected to be used in every area; however, when the information gathered indicates the appropriateness and necessity of a threshold level, the land use planners would establish the policy and leasing would be conducted accordingly.

19. **Comment.** "Threshold levels must be specified in every plan. They should not be discretionary."

Commenter 156

Response. The threshold levels would not be used in every instance, but planners would be required to consider whether they should be used. The threshold level could be established in the land use plan or later, depending on when its necessity becomes apparent. The Assistant Secretary-Land and Water Resources-has asked the BLM to study the threshold concept as part of its development of the final BLM planning regulations. At this time we believe that it is impossible to specify a single set of specific threshold levels that would be reasonably applicable to all of the planning units administered by BLM. In addition we do not believe the BLM should determine by itself what socio-economic changes are acceptable. This should be determined in concert with state and local governments with full review by the public. This requires active participation and concrete suggestions by state and local governments if socioeconomic thresholds are to be considered.

20. **Comment.** "In the Draft ES for the Western Coal Leasing Programatic is a paragraph on page 3-21 which addresses Thresholds - ecological and socio-economic. How can a person or a governmental entity go about requesting a socio-economic threshold study for the North Fork? If resources

other than coal are to be preserved, such a study appears to be imperative."

Commenter 032

Response. The BLM has conducted studies in the North Fork and developed a land use plan. That plan places limits on the amount of Federal leasing primarily for socio-economic reasons. Before that plan could be modified, an updated plan or most likely new planning effort would have to be undertaken. This plan would be coordinated with the state and local plans and in all likelihood, conform to socio-economic thresholds recommended in these plans. If no local or state plans or goals exist, the BLM, through its planning process as defined in the regulations would develop such goals. This process is, of course, open to the public and requires their input.

21. **Comment.** "We further request that the concept of threshold development levels, found on page 3-21, be clarified and that the final document state that this concept can be applied to existing MFP'S."

Commenter 157

Response. The Department is working on refining the threshold concept. The results of this work may be reflected in the final BLM planning regulations scheduled for release in June, 1979, if appropriate. This concept will generally not be applied to existing MFP's, however. Before any new leasing, the Department would (1) apply unsuitability criteria and conduct surface owner consultation and publish supplements to existing MFP's; (2) delineate and rank tracts from all the planning units within a production region and (3) write an ES documenting the tract, delineation and ranking process. Socio-economic and environmental thresholds could be proposed during steps 2 and 3 above.

22. **Comment.** "Criteria should be developed to determine threshold development levels, and these should be used to identify areas as unsuitable for mining as early as possible in the planning process."

Commenters 202 203, and 281

Response. The threshold development concept and the unsuitability criteria are supplementary insofar as they tend to avoid or minimize impacts of coal development; however, the threshold concept is inappropriate as a criterion. The unsuitability criteria are used to eliminate areas initially from mining while the threshold concept involves a balancing judgment by the land manager useful throughout the planning and leasing process. The threshold pertains not to areas unsuitable but to levels or rates of development that are so great as to cause excessive stress to other resource values or to result in impacts not expected at lower levels or rates.

The unsuitability criteria are a test that determines the need to eliminate a specific area from leasing because of the innate value of that area. The threshold concept considers the need to limit the number of leases in a given area because of the effects that leasing would have on values associated with the surrounding lands. The need for establishing thresholds may become evident early in the planning process, however it may not become evident until the regional level tract ranking process is conducted. The Department is presently examining options for including threshold analyses in the BLM planning regulations. These regulations will be published in final form in June, 1979.

23. **Comment.** "Number 6, threshold development level. The threshold concept is particularly appropriate and applicable to Montana's balanced growth program when considering socio-economic impacts. The threshold concept would orient decisions more toward impacts dependent on levels or rates of development rather than on a site specific basis alone. Threshold levels could be developed for wildlife species populations.

"For example, a ten percent decrease in total population of wildlife might be an acceptable trade-off. It might be appropriate to establish threshold development levels in association with the unsuitability criteria.

"In terms of social and economic infra-structures, the rate and amount of coal development might be critical. A recommended threshold leasing or development level and rate would be appropriate and compatible with the balance growth policy.

"The draft indicates that this could be a part of any of the alternatives but does not definitely include it.

"It would appear to benefit Montana if threshold leasing or development levels could be specified in the land-use plan prior to tract

selection and identification, assuming that such information is available at the time.

"I would like to see an expanded use of the threshold concept in future land-use plans, unsuitability criteria and tracts ranking and selection procedures."

Commenter 170

Response. While some threshold development levels conceivably could be determined during application of unsuitability criteria, these decisions as to optimum levels of development would be established, where appropriate during the planning process as information is gathered and digested. Thresholds could also be determined in later steps of the leasing process, but if the planning process indicates the necessity it could and should be made during this earliest phase. The environmental statement describes the significant use of the threshold concept that would be made whatever the adopted management approach. As pointed out this concept would be least useful in the lease to meet industry needs alternative.

The threshold concept is now the subject of a special Department of the Interior study being conducted by the Bureau of Land Mangement. It is expected that the threshold concept will be expanded and become a part of the BLM land use planning regulations.

24. **Comment.** "The Colorado Mountain Club requests that a threshold analysis be done on the North Fork Valley. Threshold analysis is referred to under section 3.2.1.4, pg. 3-21 of the DES Federal Coal Management Program. The threshold analysis should cover socio-economic concerns such as transportation for both coal and workers, housing, schools and support populations. The purpose of the study should be to determine what level of mining the valley can absorb and still retain its attractive rural character."

Commenter 026

Response. At the present time, the Department does not foresee the immediate need for any additonal Federal coal leasing in the North Fork Valley. If subsequent demand projections indicate a need to lease, one of two courses of action would be pursued. One, the existing MFP would be updated as described in chapter 3 of the FES or, two, a new planning effort as described in the BLM-proposed rulemaking for planning the use of public lands as described in the December 15, 1978, Federal Register would be accomplished. In both efforts, the issues raised above would be thoroughly considered.

25. **Comment.** "The Department should move toward more of a problem-solving approach in the next round of regional EIS's to identify and resolve regional environmental-social problems. Threshold environmental criteria should be established in the EIS process. We request that EPA be named as a formal participant in the "scoping" process for these EIS's."

Commenter 281

Response. The Department will, if the preferred program is adopted, move toward a problem-solving approach in the development of regional lease sales environmental impact statements. Regional analyses would include consideration of threshold levels of environmental degradation, though the Department prefers to conduct its analyses in terms of minimization of environmental damage rather than risk setting a standard for damage. EPA would be asked to participate in the regional analyses in the areas of its expertise, including participation in the scoping meeting for the impact statements.

26. **Comment.** "Section 3.2.1.4 on page 3–21: Threshold Development Levels We endorse the concept of threshold development levels for a given area based on land use planning rather than going solely by industry's expression of need. We also suggest that units of habitat may be a better criterion than actual numbers of animals or percent of population. Some wildlife populations fluctuate drastically from year-to-year within a given area of habitat."

Commenter 266

Response. The Bureau of Land Management is conducting a study to determine the feasibility of employing the threshold concept throughout their planning system. It is expected that the threshold for most wildlife purposes will be set on the basis of habitat disturbed.

UNSUITABILITY CRITERIA

1. **Comment.** "A number of commenters expressed technical concerns with the unsuitability criteria and others suggested new criteria."

Commenters 148, 144, 098, 057, 034, 037, 157, 017, 134, 178, 163, 067, 093, 066, 060, 108, 076, 095,

200, 109, 167, 165, 164, 042, 029, 092, 068, 101, 197, 202, 266, 281 and 287

Response. Because of the on-going field tests of the present version of the unsuitability criteria, the Department has selected to postpone technical response to the unsuitability criteria. All comments will be considered while preparing the final version of the unsuitability criteria after the results of the field tests are compiled in early May.

2. **Comment.** "The lands unsuitability criteria must be based on competent scientific opinion without arbitrary and capricious exceptions. They must place the burden for determining reclaimability on the BLM and must take into account off-site, cumulative and socio-economic impacts. The planning process must mandatorily apply consistent threshold criteria to levels of development."

Commenters 156, 168, 108, 121, 085, 092, 076, 060, 188, 197, 097, 099, 193, 105, 123, 154, 144, 148, 164, 157, 042, 203, and 165

Response. The BLM under the preferred program will determine the unsuitability of lands for mining based on sound resource data. The criteria will be applied as a part of all planning efforts. The Assistant Secretary for Land and Water Resources has directed that the BLM further define the threshold concept for incorporation in the BLM planning regulations. It must be recognized that the best planning regulations insure consistent application of law and policy while providing the planner with enough discretion to take advantage of site or area specific environmental differences.

Although there is a criterion that eliminates those lands which are clearly known to be unreclaimable during the land use planning process, the final determination on reclaimability of all coal land proposed to be mined will be made after review of the mining and reclamation plan except for extreme cases. Only at this stage will there be available the site specific data needed to make this more definitive determination.

3. **Comment.** "The results of this land use planning are proposed to be continued under the 'start-up considerations phase'. The plans will be overlain with the thin veneer of the lands unsuitability criteria. Lands unsuitability criteria is a much needed management tool which we fully support. As proposed, the criteria are weak and ignore important kinds of impacts, but these can be corrected with rewriting. However, their effectiveness depends on the quality of the land use planning system, which forms the foundation. Use of the criteria cannot redress the deficiencies of the planning system, just as one can't patch a crumbled foundation. Yet these criteria are being used now, before public comment and rewriting, before a coal management system has been chosen, before compliance with the National Environmental Policy Act, and before new land use plans have been written using the multiple use-sustained yield mandate of FLPMA (Federal Land Policy and Management Act)."

Commenters 154, 168, 144, 097, 125, 165, 060, and 123

Response. Application of the unsuitability criteria to exisiting plans is dependent upon the data needed to apply the unsuitability criteria. These data should be contained in the existing resource inventories. Where these data are found inadequate, they will be supplemented or that area dropped from immediate consideration. Those criteria that are changed as a result of the review comments on the Draft EIS will be re-applied to the selected planning areas. Changes to the exceptions are more likely. Such changes would be easy to incorporate in to the on-going analysis after the Secretary's coal program decisions. Note that the process for applying unsuitability criteria as set out in the Federal Register notices of December 8, 1978, discourages the local land manager from using the exception provision of the criteria.

The unsuitability criteria are only one step in the start-up phase of the program. Tract identification and ranking on a production region basis will also be carried out after a substantial opportunity to discover and avoid environmental conflicts. This phase of the program will be documented in an EIS, with opportunity for additional public comment. Finally both FLPMA and the National Forest Management Act permit the use of existing plans until plans prepared under these acts are available (see Section 5.4).

4. **Comment.** "B. Premature Application of unsuitability criteria. The application of unsuitability criteria should be halted because of the following reasons:

(1) The criteria are part of the preferred program and should not be applied until

the criteria are in final form and a coal program in effect.

(2) The criteria are being applied prior to public comment.

(3) The final criteria could be different than the proposed criteria.

(4) The Department is locking itself into the preferred alternative, and will be unable to seriously consider other alternatives.

(5) The BLM does not have an adequate data base.

(6) The criteria are being applied to ten (10) priority leasing areas.

(7) The criteria are being applied to existing approved MFPs, some of which should not have been approved.

(8) Instructions state that application of the criteria '... should in effect, confirm prior planning decisions.' (F.M. No. 79–4, Oct. 13, 1978).

(9) The criteria are being applied to (approximately 900,000 acres) acreage sufficient to result in at least forty (40) potential lease tracts in Colorado, Wyoming, Montana, and Utah (F.M. 78–85, Sept. 21–78).

(10) The November, 1978 to May 1, 1979 schedule violates NEPA and the District Court's Order in *NRDC v. Hughes* (Attachment 2, Terris letter of Nov. 24, 1978)."

Commenter 168

Response.

(1) The on-going application of the criteria will enable the Department and the public, to gain experience with this new coal management feature before it is finally accepted. The Department believes this is good management practice.

(2) The application of the criteria allows for public comment and allows the public to become better informed on the strengths and weaknesses of the process and the unsuitability criteria before the Secretary's final decision.

(3) Any changes in the draft criteria used in preparing the supplements will be reanalyzed and entered into the supplements before their final publication.

(4) "In no way do I feel bound to the preferences I expressed last summer," Cecil D. Andrus, letter to Natural Resources Defense Council, March 23, 1979.

(5) The BLM is under instructions to provide for data collection on unsuitability later in the process if presently available data are inadequate to make a reasonably certain decision.

(6) The criteria are being applied to 9 western planning units and in the north central Alabama Land Use Analysis.

(7) BLM procedures provide for amending existing approved land use plans.

(8) The instructions do not specify that land use managers confirm prior decisions *uncritically*. This is an incorrect inference.

(9) The criteria are being applied to 540,000 acres in Colorado, Wyoming, Montana, and Utah. If the Secretary decides there is an immediate need for lease sales in these states, these acres might, after unsuitability and surface owner consultation screening, be areas from which it would be expected that from 10 to 40 logical mining units could be formed.

(10) The Department believes its actions in this regard are wholly legal.

5. **Comment.** "Re: Draft EIS Coal Management Program. Feel that program overall is well conceived. Have doubts about status of PRLA's in program. Since legal situation is not yet clear, legislation for reimbursement or exchange does not exist. Feel that a separate EIS should be done on PRLA. Strongly support notion that Unsuitability Criteria should be applied to PRLA's and rejection or exchange made as necessary. Also not clear as to whether Unsuitability Criteria apply equally to deep mining especially as regards socio-economic impacts, water quantity and quality, and subsidence in alluvial valleys needs to be clarified."

Commenter 086

Response. The Department believes the proposed program and this EIS adequately address management of PRLA's. A new section has been added to Chapter 3 and a new appendix (Appendix I) has been included, both of which address the management of PRLAs. Some new authority may be required for exchanges. Unsuitability criteria will be applied to PRLA's. Unsuitability criteria will consider the on-site impacts of underground mining. All unsuitability criteria are under review.

Modifications will be published in proposed rulemaking. Socio-economic and water quality and quantity questions are addressed mainly in the regional environmental analysis. Subsidence and alluvial valley questions are addressed during unsuitability screening and again at the mine plan review.

6. **Comment.** "We believe that the DES does not adequately address the effect of making unsuitability determinations at the time of the first step in the preferred program, which is the land use planning stage. Neither does it adequately address the effect of the unsuitability criteria, which are excessively restrictive. Nor do the unsuitability criteria nor the priorities expressed in the DES, with respect to multiple use resource management tradeoffs, appear to be in conformance with the policy of the Mining and Minerals Policy Act of 1970.

"In order for the land use planning process to work properly, there must be industry input in the land use planning stage to narrow the area to be examined in detail for potential mineral production. Section 522 of the SMCRA indicates that unsuitability determinations must be made on the basis of competent scientific data. At the land use planning stage, there is not enough data in the hands of the government to do this over the large areas encompassed in the land use planning units. Therefore, it is important to have early input from the extractive industries as to areas of interest in order to focus the study efforts.

"There must also be industry input before any unsuitability designation becomes final or before adoption of any multiple-use resource management tradeoff which would exclude mining from any area. This is essential in order to obtain the benefit of various opinions as to the possible reclaimability of the land or the applicability of other unsuitability criteria or as to the value of the area for coal production as compared to other uses. In this regard, mineral production has been historically considered to be a land use superior to other potential uses due to the fact that minable concentrations of minerals are rare and that *they must be mined where they are found.* In reading the DES, one obtains the definite impression that the Interior Department has swung 180° and now considers coal production the land use of last resort. For example, with respect to the resource tradeoffs to be made in the multiple use determinations, there is a bias against mineral production evidenced in the DES, as witnessed by statements to the effect that recreation sites or campgrounds would be considered values clearly superior to coal production.

"Moreover, a number of the 24 criteria which can determine that lands are unsuitable for mining are strictly within the discretion of the DOI, are not mandated by statute, are unreasonable and arbitrary and are not supported by the experience of industry."

Commenter 087

Response. The Department does not agree with these allegations regarding its intentions. Specific responses have been made elsewhere to similar comments.

7. **Comment.** "Finally, according to the Memorandum of Understanding between BLM, the Office of Surface Mining, and the United States Geological Survey (published in the *Federal Register* 12/8/78), OSM must concur with the criteria employed in BLM's federal lands review. To our knowledge, this concurrence has not yet taken place, thereby invalidating any BLM efforts to implement that review."

Commenter 144

Response. While a letter setting out primary responsibilities of these three agencies has been published, the formal Memorandum of Understanding will be developed after the Secretary's decision on the coal management program. The standards eventually approved will be those approved by the Secretary and both BLM's and OSM's views will be taken into account.

8. **Comment.** "The criteria should be consistent with the laws under which they are promulgated. This is of particular concern with respect to the criteria which cover endangered species, bald and golden eagles, falcons, and reclaimability."

Commenter 060

Response. The Department believes these criteria are consistent with law. A change was made in the bald and golden eagle criterion to ensure such consistency.

9. **Comment.** "The impression one gets from reading all the criteria to be used to determine 'suitability' is that when no other 'values' can be identified for coal lands, such lands will be considered for leasing. At least some effort should

be made to quantify how much 'Roadless Areas', 'Scenic Areas' 'Natural Areas', 'Endangered Species Areas', 'Migratory Birds Areas' etc. the nation can afford. Some effort should also be made to determine 'cost/benefit' ratios for such 'areas' vs. coal development. "For example, Table 5–73 on page 5–154 indicates that the 'Lands Unsuitable Field Test Summary' shows *Montana* to be *100%* Historic Lands, *98.2%* High Interest Habitat, *89.9%* Private Surface/Federal coal. So much for Montana.

"I also thought the *authority* for setting forth criteria used to determine 'suitability' or 'unsuitability' rested on *statutes*. . In a number of instances, Table 5–72 indicates the ' *authority'* rests on *'Departmental Policy'*, not Acts of Congress. In the case of 'Criterion 8-Natural Areas', the 'authority' rests on 'Departmental Policy' *and* a *'proposed' piece of legislation.* Query, suppose Congress decides not to enact the proposed legislation establishing 'a National Register of Natural Areas'. What happens then to 'Department Policy'?"

Commenter 053

Response. All of the unsuitability criteria are required by statute or are designed to meet goals or purposes of statutes through discretionary authority granted to the Secretary by statute. In reference to National Areas, the Department will protect most of these areas of Critical Environmental Concern as defined in FLPMA. It should be noted that the exclusions made under this criterion were 0% in Wyoming, 0.8% in Montana and 0.75% in Utah. The reference to the Montana statistics do not reflect the amount of land that would be set aside under these criteria because no exceptions were applied and the data were incomplete. If the Congress specifically repudiates the "natural area" concept, the criterion will be dropped. Further testing will help the Department better understand the effects of these standards before they are finally adopted.

10. **Comment.** "Recommendation - The process of defining and applying exceptions to otherwise applicable criteria should be clarified, so that the resulting product will allow all areas which are or could be determined to be subject to exceptions remain available for further consideration in the planning process."

Commenter 098

Response. The purpose of the unsuitability criteria is to protect identified resource values associated with the land in question. In areas where mining can occur without damaging these values, exceptions can be applied unless statutes specifically prohibit mining in the area, i.e. National Parks.

11. **Comment.** "We recommend that the procedural aspects of the unsuitability criteria application mechanism be substantially clarified. It should be clearly delineated from management activity which would determine multiple resource use trade-offs, and specific departmental responsibilities assigned."

Commenter 098

Response. The procedure for applying the unsuitability criteria are explained in the December 8, 1978, Federal Register (Vol. 43, pp. 57662–57670). The BLM land management planning steps are defined in the December 15, 1978, Federal Register. (Vol. 43, pp. 58764–58774).

A further description for determining threshold levels will be included in the final rulemaking on the BLM Land Use Planning procedures.

12. **Comment.** "*Section 3.3.3,* concerning management of existing leases, indicates that in the case of non-producing leases, the Department's preference is to apply the unsuitability criteria to the area of the leasehold at the time the lessee submits a mining plan. Utah Power would strongly object to this procedure in that substantial investments are often required in the preparation of a mining plan and the lessee should have some indication prior to risking such substantial investment that much of the property will not be determined to be unsuitable for mining. It believes, in most cases, that adequate information would be available to the various agencies involved to make a preliminary determination as to unsuitability. We suggest a procedure whereby an application for a preliminary determination could be made and an early response received as to whether there is any reasonable chance that any of the lands involved in the mining plan would subsequently be declared unsuitable for mining. The same section indicates that outstanding P.R.L.A.s would be examined for acceptability for mining, using the same unsuitability criteria, but this process would not depend upon applicant initiative. This would appear to indicate that there should be some

process by which existing leases could be examined, preliminarily at least, without the cost, expense and time in preparing a mining plan from the first instance.

"Utah Power is, in fact, extremely concerned about the procedure which may be followed in eliminating the so-called 'lands unsuitable for mining'. While we recognize that the Department's choices are limited by statutes and other constraints, the opportunities for abuse are so extensive as to be staggering. In reviewing the numerous bases for classifying lands as unsuitable for mining, it becomes obvious that more coal lands in the West could be classified as unsuitable (if the rules were to be stringently followed) than would be available for mining. While this is an area which might better be discussed in another forum, Utah Power strongly urges that great restraints be followed in applying the lands unsuitable for mining criteria. Otherwise a situation could arise not only where extensive tracts would be unavailable for mining, but where those tracts left after elimination would be of a nature that economical mining there would not be possible. Moreover, it is imperative that an adequate system be devised to compensate lessee for the financial losses which would naturally occur to them if lands upon which they have made substantial legal investments are subsequently declared unsuitable for mining and the lessees are precluded from utilizing them for that purpose."

Commenter 078

Response The recommendation for a preliminary finding is being considered by the Department.

The application of the unsuitability criteria will be a public process; as such, all interested parties will have the opportunity to provide information and recommendations to the land use planners involved. The purpose of twice field testing the criteria is to better ensure that the Department has full understanding of the likely effects of applying each criterion before the Secretary decides upon the criteria.

13. **Comment.** "There also is no basis to try and determine certain things like buffer zones. I mean is a quarter mile or is a half mile better? I don't really see any kind of supporting data on that."

Commenter 148

Response. Wildlife management practice provides ample guidance for the concept of buffer zones. Local conditions must be considered when establishing buffer zones to protect important wildlife and their habitat. Consideration of adequate habitat for feeding, breeding, and resting are necessary. The suggested buffers in the criteria are designed to assure that planners consider buffers before going below the specific sizes indicated. It is intended that buffer zones would be set on a case-by-case basis.

14. **Comment.** "We want the extraction of the coal to be of the least total disturbance to the land, to the present landowners and to the existing communities. To be fully consistent with this goal, the same criteria should be followed for existing nonproducing leases, preference right least applications and presently unleased coal lands."

Commenter 145

Response. The unsuitability criteria will be applied to all federal coal lands of medium and high development potential. These criteria will generally be applied during land use planning and review of mining and reclamation plans. The unsuitability criteria will be applied to PRLAs and existing non-producing leases before mine plans are approved if not during land use planning.

15. **Comment.** "The land use planning process will be used to identify lands that are unsuitable and suitable for coal mining, through the Lands Unsuitability Criteria. The EIS states that the application of the unsuitability criteria is the key activity of the land use planning process in the preferred program. However, we have found the unsuitability criteria to be one of the weakest components of the proposed program, for the following reasons:

(1) The unsuitability criteria do not account for cumulative and offsite impacts, but only impacts that will result on an individual lease tract. Such a narrow approach will cause serious consequences to such resources as wildlife habitat.

(2) The criteria and the numerous exceptions to them encourage subjective judgments concerning the significance of impacts from mining to other resources such as scenic, scientific, historic, and wildlife resources, wetlands, municipal watersheds, and National Resource Waters.

(3) The unsuitability criteria demand subjective judgements concerning the significance of a

resource itself. For example, historic resources must be of national significance if they are to be protected. Historic features of local or regional significance are given no protection.

(4) The unsuitability criteria offer no protection to roadless areas during the inventory processes, before Wilderness Study Areas are designated."

Commenter 200

Response. The unsuitabilty criteria are designed to eliminate areas from consideration for leasing because of the innate high value of that land. There are many other points in the planning processes where cumulative and off-site impacts are assessed such as the multiple use trade-off process early on in the land use planning process and in the tract identification and ranking process and the socio-economic and governmental analysis associated with these steps. At all of these steps cumulative and off site resources will be considered. The commenter makes the mistake of ignoring the rest of the management process and demanding all critical decisions be made in only one step in that process — the criteria application step.

Any comparison of the relative values of wildlife resources, wetlands, coal development, municipal watersheds etc., is necessarily a subjective process. The only certainty in this process are in those areas where definable resources are given statutory protection. Recognizing the subjective nature of many of these decisions the Department has developed a program that fully discloses these values, resolves to the maximum extent resource use conflicts, and makes the necessary trade-offs in a public forum with full opportunity for local government participation in the decision process.

In regard to the importance of historic resources of regional significance they could not be considered for leasing without the concurrence of the State. These resources could be permanently protected by a state proposed criterion that was adopted by the Secretary under criterion (w). In regard to BLM lands possessing wilderness characteristics but not yet designated as study areas, these areas specifically require review before leasing by the wilderness study area criterion to determine if they posess wilderness characteristics. If they do, they will be found unsuitable.

16. **Comment.** "The second major deficiency of these criteria is that they give BLM the authority to make determinations in areas where it has little or no expertise. Several of the criteria require BLM to 'consult' with other agencies, such as the United States Fish and Wildlife Service. Consultations are not binding, thereby leaving BLM to make final decisions which may or may not be consistent with the information derived from the consultation."

Commenter 144

Response. The BLM is the agency ultimately responsible for land use management decisions relative to national resource lands. Congress has required the BLM to seek advice from state and local governments, public and private organizations, individuals and other federal agencies. Some consultations are mandatory, but at no time has Congress recommended another party be responsible for determining the use of national resource lands.

The Department does not believe one agency should make specific land use decisions and a second agency carry out those decisions.

17. **Comment.** "Section 3.2.1 (p. 3–18) makes reference to guidelines of the Federal Land Policy and Management Act which include the giving of priority to designation and protection of areas of critical environmental concern. Such areas have been highly favored recently by some of the environmentalist groups as representing a compromise between industry and environmentalists in the battle over designation of lands for wilderness preservation. It is of course uncertain at this time how much land otherwise available for new federal coal leasing would be segregated as a result of the designation as areas of critical environmental concern. However, it is initially puzzling that this type of land use designation is not specifically listed or discussed in any of the unsuitability criteria. Hopefully, this can be construed to confirm that areas of critical environmental concern will be treated as wilderness areas are in the Statement, namely, as areas which automatically prohibit new federal coal leasing. There is nothing in FLPMA which would suggest that such areas should be treated like wilderness areas. It would be very helpful if the Department made clear in the impact statement that areas of critical environmental concern will not be automatically excluded from consideration for new federal coal leasing.

"Also on Page 3–18 the land use planning process for excluding lands as unacceptable for consideration for coal leasing is again described but this time it is stated that land would not be excluded in favor of another use unless that other use was clearly superior to new federal coal leasing. This statement is easily lost among the many statements which would indicate to the contrary that new federal coal leasing has been given a very low, if not the lowest, priority among all other land uses. The final environmental impact statement should correct this confusion by consistently stating that federal coal leasing will not be eliminated as a possible land use in favor of any other land use unless that alternate use is clearly superior to coal leasing.

"At the end of Page 3–18 the final paragraph refers to the fact that the land use plans would be updated only every five to seven years. This would appear to be inconsistent with the long term four-year cycle of new coal leasing. Presumably each new lease sale would require at least a review and possible update or supplement to the land use plans to reflect changed conditions particularly as regards criteria which previously applied to exclude lands from mining."

Commenter 066

Response. Many areas of critical environmental concern, will likely be eliminated from consideration by application of the unsuitability criteria. Where unsuitability criteria would not apply to areas of critical environmental concern, the management plan for each area would determine whether all or certain types of mining would be permitted. It would also be possible, although less likely that although a type of mining would still be permitted after application of a criterion, the management plan for the area would preclude such mining. The Department will not publish regulations for determining areas of critical environmental concern but instead will issue guidelines and manual instructions to the field. The impact of these directions will be wholly dependent on site specific conditions and might permit mining in rare cases. Unsuitability criteria are aimed at determining those situations where resources exist that would be protected regardless of the value of the coal.

The Department expects that the land use plans that are developed in accordance with the new regulations would not have to be redone for several years. The tentative target is 15 years. In the activity planning step of this process, many potential lease tracts would be identified and ranked. At the completion of this ranking, a number of tracts sufficient to meet the anticipated demand would be offered in a competitive lease sale. Lease sales would be scheduled for every fourth year, however, two years after the initial sale, the demand would be reassessed. If it were determined that the demand had been underestimated on the previous sale, another sale would be scheduled. The tracts to be offered would be selected from the tracts previously ranked and from tracts that had been identified in plans completed in the intervening two years. Older plans would not be supplemented.

18. **Comment.** "Section 3.1.1.1 deals in detail with the various planning systems of the preferred alternative. Under the Land Use Planning portion of this Section the first criteria for screening out areas unacceptable for new federal coal leasing would be areas that do not contain coal reserves of high to moderate development potential. It is not clear what authority or justification the Department is relying on in applying this criteria which is presented as distinct from the general unsuitability criteria and every other factor suggested by law or regulation which should affect the potential development of coal reserves. Apparently, the Department is attempting to substitute its engineering and marketing judgement for that of the industry and this is not warranted. The economic potential for the development of reserves aside from clear legal restrictions, is constantly changing and the federal government cannot hope to have as much information concerning current market conditions or have sufficient expertise to predict future market trends as will potential lease bidders throughout the industry. Since this screening criteria is so nebulous, it would be appropriate to include in the final impact statement, at the very least, some detailed justification for this screening criteria along with an example of how the criteria might be applied over and above all other restrictions and limitations on new federal coal leases to exclude property which would otherwise qualify for a lease sale.

"In the same section on Land Use Planning, a very disturbing implication is left that the Department will indirectly engage in population control,

presumably only at the instance of a state government request, by deliberately limiting coal production from a region regardless of other factors and of the market demand in order to accomplish an artificial maximum limit on population in that area. It is unknown what, if any, authority the Department could claim for such action but it would certainly be necessary for the Department to elaborate on this suggestion in the final impact statement and particularly to discuss what, if any, public input would influence a decision to so control a region's population even without the request of any state government."

Commenter 066

Response. The method of determining medium and high potential coal development areas is described in USGS publication 1450B. If industry representatives believe there are areas in the low potential area that should be considered in the planning process they can submit supporting information to the BLM for their consideration.

The FLPMA directs the Department to coordinate their land use plans with local plans. Those plans may support the need to control population growth rates. If this is an objective of the local or state government the Department would constrain development on federal lands to insure the success of those plans unless it was clearly contrary to the national interest.

19. **Comment.** "While there is some merit in reviewing potential lease areas for 'unsuitability' before the lease is executed, it should be noted that relatively little technical information is available until a mine plan is actually developed. Hence, until the latter stage, there is little or no available information which could or would form the base for mitigation of harmful effects of mining — mitigation which would render an area entirely suitable for such activity, even though pre-lease information might lead to the opposite conclusion.

"More importantly, by placing the unsuitability test in sequence prior to an expression of area interest on the part of industry, and, for that matter, even prior to any preliminary tract selection by the Department, the workload is grossly and unnecessarily compounded, especially with the detailed tests which would be required by the use of the proposed criteria. Moreover, the unsuitability test may well be reapplied during the mine plan review phase after the lease is issued. Hence, the earlier unsuitability review could be duplicative."

Commenter 069

Response. The Department's proposed program is essentially a series of screens that eliminate areas that are unsuitable for consideration for leasing as soon as they are identified. Application of the unsuitability criteria is one of those screens. The data needed to apply the majority of the unsuitability criteria are available. The Department believes it would be wasteful to consider any areas for leasing which could easily be tested early in the planning process. It is true that some criteria such as alluvial valley floors cannot be adequately asessed in all areas. The procedure for application of the criteria clearly calls for continuing the land in the planning process for further consideration for leasing if not enough data are available. It is very likely that some alluvial valley floor lands may be carried all the way through the process to the development of the mine plan stage before they are rejected.

20. **Comment.** "Indeed, if tables in Chapter Five Unsuitability, (page 5–154) are any indication, the criteria would prohibit coal leasing on an almost wholesale basis."

Commenter 069

Response. Present data indicate the criteria will not prohibit coal leasing on an almost wholesale basis. If this turns out not to be true, and the problem lies in overbroad actions by the Department it can take steps to reuse the standards to achieve the correct balance between resource protection and coal development. If the fault lies in statutes, or executive orders, changes will be sought in these areas. The data cited were data from the field-testing of draft criteria. If the commenter had more carefully read the statement, he would have learned that the few criteria which excluded significant percentages of land were more tightly drawn when selected by the Under Secretary for the preferred program. The Department is again field-testing the selected criteria. Should any of these criteria also exclude too high a percentage of coal land they too would be altered.

21. **Comment.** "Table 3–1 describes in general terms the twenty-four separate unsuitability criteria all of which would be applied to each and every tract of federal coal lands considered for new leasing under the proposed program. In reviewing

this criteria it must be again stated that it would appear that the Department's new coal policy is that: 'When in the slightest doubt, don't lease.' That is, if the collective imaginations of all the government officials and public interest groups which will be influencing the application of this unsuitability criteria cannot exclude coal leasing on the basis of using the land for anything else then that land will have an opportunity to be further considered for possible eventual leasing. It would seem that assigning what amounts to the lowest possible priority to federal coal leasing on any tract of unleased federal coal lands is completely contrary to numerous expressions of Congressional and Administration intent to greatly increase coal production for federal lands.

"Certain of the more potentially significant unsuitability criteria deserve specific attention because in some respects all or almost all of them are felt to be overly broad or poorly conceived. The first criterion deals with Federal Land Systems and indicates that all federal lands which are recommended for inclusion in preservation systems such as the wilderness Preservation System would be automatically excluded from further consideration as unsuitable for coal mining. Taken literally, this would mean that *all* lands in National Forests presently under review in RARE II process would automatically be given no consideration for coal leasing as well as all lands under the administration of the Bureau of Land Management which are presently being inventoried for review as potential wilderness areas. The Bureau of Land Management review will not necessarily be concluded until the year 1990. Clearly, such an automatic exclusion without opportunity for appraisal by individual land unit or particular lease tract to determine if indeed there is any potential for further review and designation is unwarranted and could eliminate vast tracts of federal coal lands unjustifiably.

"The criterion concerning Rights-of-Way and, Easements would, with certain exceptions, exclude portions of 'federal lands' as unsuitable for coal mining which are within any rights-of-way and easements or within surface leases for just about any use. Since the term 'federal lands' is used in the text to describe lands in which the United States owns the coal but private interests own the surface, the application of this criteria would require initially the horrendous task of reviewing title to all private surface over federal coal to identify such rights-of-way, easements and leases. Apparently, the existence of a surface agricultural lease even by one who would not otherwise be granted surface owner protection would be enough to completely exclude an area from future coal mining and particularly from strip mining. There is no legal justification for this situation and this criterion must be strictly limited to landowners otherwise protected by SMCRA so that it is not readily abused by groups which could obtain such rights-of-way or easements for nominal prices in the hopes of delaying or completely blocking federal coal production from the land in question.

"The criterion related to Wilderness Study Areas has the same problems as those discussed for the criterion related to Federal Land Systems above.

"The dual criterion related to State Lands Unsuitable for mining and State Proposed Criteria would seem to have the potential effect of requiring the Secretary of the Interior to abdicate his authority and discretion in the leasing of federal coal lands to the State in which the federal coal lands are located. Again, there appears to be no legal justification for this extreme result and it is contrary to the clear intention of Congress that the Secretary retain primary authority and discretion for leasing such lands with considerable state participation but not control.

"The criteria concerning both federal and state designated endangered species would not seem to allow for the flexibility which has characterized the resolution of problems related to most applications of the Endangered Species Act since its enactment. Environmental groups and the Administration fought the amendment of the Endangered Species Act in the last Congress on the basis of statistics which indicated that of the thousands of instances in which the Act created a conflict with development of any kind, including numerous coal mining operations, the government, public interest groups and the private companies involved were able to work out compromises which did not result in the serious modification or prohibition of the development. However, when one considers that the application of criteria only somewhat more strict than the criteria presented in the Statement resulted in the exclusion of one-third to one-half of coal lands in sections of Montana and Wyoming as unsuitable for coal mining based largely on

identification of endangered species and critical wildlife habitat, it would appear that these two criteria are going to be applied in the proposed alternative for the long range federal coal leasing program with an inflexibility that would not permit similar compromises but would completely prevent the development of coal operations on the lands in question. If these implications are indeed an accurate reflection of what the Department is proposing in this Statement, then that should be made clear and a justification should be presented in detail for departing from what has been a rather successful and reasonable past practice.

"The last criterion which deserves particular mention is the one related to reclaimability. In the text the discussion of reclamation assumes unusually long time periods (ten to fifteen years) for reclaiming to legally required conditions. Apparently this time period really assumes that the initial vegetation will not be completely compatible with surrounding vegetation in undisturbed lands and that reclaimability means the slow natural progression of grasses from neighboring undisturbed lands to establish dominance over and eliminate other native grasses which are required by law to be planted in the disturbed areas. Obviously, putting the burden, as it is apparently is placed, on the operator or potential lease bidder to prove such reclaimability would require long term tests that could greatly frustrate any renewed federal coal leasing in the next decade. Certainly, the Department could not have intended such a result. It is hoped in the final impact statement that this area of concern will be clarified by making it definite that compliance with existing federal reclamation requirements will be all that is necessary to prove reclaimability and that the land will not be completely withheld but that flexibility will be applied to conduct test mining operations to give a potential operator or bidder ample opportunity to prove reclaimability of the tract involved when such proof is necessary."

Commenter 066

Response. The unsuitability criteria, are designed to protect public land values that are described in numerous pieces of Federal legislation. They are formulated for the purpose of protecting values not preventing coal mining. By definition, mining would be an incompatible use of Wilderness areas, therefore, the Department does not believe lands should be leased in areas that may be recommended for wilderness designation. Congress has also prohibited leasing within the wilderness system itself and it has also severely limited issuance of new leases in the National Forest System. The Secretary will retain primary authority on leasing of federal lands. Any criteria proposed by the State must be approved by the Secretary.

Application of Criteria on endangered species and important wildlife habitat will be similar to the approach the Department has used in determining Critical Habitat in the past. Again, if the commenter had read the draft statement more carefully, he would have discovered that the endangered species and critical habitat criteria were changed to reduce their effect (see new discussion in Section 5.4 which explains the changes to the reader).

Reclaiming western strip mined land is known to take long periods of time. The purpose of the criterion is to remove those lands that are clearly known to be unreclaimable from consideration for leasing. A much more critical anaylsis of reclaimability will be made at the time the mining and reclamation plan is reviewed.

22. **Comment.** "The unsuitability criteria do not address cumulative impacts, socio-economic impacts, off-site impacts or adequately address deep-mining impacts, and there is really no public participation in their creation. We believe that the Department of the Interior is also trying to avoid NEPA review of these criteria, and we support NEPA review at all levels of this coal program from individual specific mining plans to development proposals such as the railroad into the Kaiparowitz Plateau from Cedar City as well as regional analysis. These should all be reviewed by NEPA."

Commenter 130

Response. The unsuitability criteria are not intended to cover cumulative impacts, socio-economic impacts or off-site impacts; they are intended to cover specific physical problems associated with coal mining that are the subject of various statutes, executive orders and regulations. These other areas are addressed in other ways under the program, through the land-use plans, tract selection and ranking and region wide environmental statements. The commenter has attempted to require all critical environmental decisions be made in this one step in the coal

management process, while ignoring the other steps which are more suited to the environmental decisions which are assigned them. Public participation in the process started informally late last spring after the Department's draft criteria were made available to hundreds of people, upon request. The formal involvement began on December 8, 1977 when the Department formally advised the public of the availability of draft criteria, notified the public of upcoming extensive field testing of the criteria with further public participation, and asked for comments on the criteria over three months before the Department expected to formally propose the rules. Again, the draft environmental statement on the coal management program set out the criteria in full, presented the results of early field tests and again requested comments. The present fieldtesting of the criteria has formal public participation steps as part of the process. Rather than seeking to avoid NEPA compliance in this process, the Department sought it out. Adoption of unsuitability criteria is a *requirement* of the Federal Lands Program under section 523 of SMCRA. The entire Federal lands program enjoys a specific NEPA exemption under section 702 of SMCRA. Thus the unsuitability criteria are specifically exempted from NEPA's environmental impact statement requirement. The inclusion of the criteria in this environmental statement is not in response to a legal duty, but in response to the Department's policy of making every element of the proposed federal coal management program open to public scrutiny.

23. **Comment.** "The initial step of the 'preferred program; described in the DES, consists of land use planning utilizing the planning systems already in existence in the Federal land management agencies. In this process, there would be a determination of the lands unsuitable for mining and a determination of lands considered more valuable for other uses. We believe it is imperative that the coal industry and private mineral interest owners be consulted during this planning process, in addition to the State Governments, because of the substantial effect the selection process will have on adjacent or contiguous private and State owned reserves. If Federal reserves are withdrawn from development without sufficient consideration of adjacent reserves or effects on those reserves, the remaining parcels may be fragmented or too small to be economically developed. For example, Burlington Northern has substantial ownership checkerboarded with Federal lands in Montana and North Dakota. Those reserves cannot be considered in many instances to be logical mining units without the adjacent Federal coal and the same would be equally true for the Federal reserves if our coal is not developed. Thus unilateral Federal decision that the Federal coal is unsuitable for mining could make the mining of our coal uneconomic. To deny the opportunity to share in this decision-making process would be tantamount to confiscation of our property without compensation."

Commenter 067

Response. Industry participation is welcomed during general land use planning, and this has been emphasized in the final EIS. Industry would be expected to be a strong, forceful advocate of leasing certain lands. The unsuitability criteria are designed to protect naturally occurring features or values designated directly or indirectly by Congress as worthy of protection. Industry data bearing on the criteria or their exceptions may be submitted to the local BLM office.

24. **Comment.** "Criterion (w), state proposed criteria, should be rewritten so that it can be applied to existing MFP's. The wording now indicates that such criteria can only be proposed before a draft land use plan is issued. There is no indication in the planning process that draft land use plans will be written where there are existing MFP's. This is undoubtedly an oversight and should be corrected in the final."

Commenter 157

Response. We have modified the criterion to allow application of state proposed criteria to BLM supplements.

25. **Comment.** "Another concept warranting serious consideration, whether in a criterion or applied in some other way, is whether the leasing or approval of a mining plan in an undeveloped area requires a new major transportation system, which in turn would require many more mines to be approved in order to support the system financially, in other words, what the effects of approving the mining plan in the undeveloped area are beyond that of the effects of the mine itself."

Commenter 134

Response. These aspects must be considered in the regional lease sale EIS.

26. **Comment.** "The 'unsuitability criteria,' it seems to me, are likely to *prevent* the development of federal coal rather than to provide appropriate safeguards for its orderly development at a rate consistent with National energy needs. Individuals or groups who wish to block all future new mines could claim that one or another of the unsuitability criteria as written could be applied to virtually every tract of federal coal land no matter where located."

Commenter 017

Response. The Department does not believe that "unsuitability" will seriously constrain regional coal development. The Department has field tested an earlier set of criteria and after reviewing the results of the field tests, altered the criteria to those proposed in the draft EIS. The Department believes that the criteria as now drafted would not seriously constrain regional coal development. However, to be certain of this, the proposed criteria are now undergoing a second, more extensive field test. These draft criteria will be modified to accommodate objective comments received as a result of the EIS review; however, we do not expect major changes in the amounts of land that would be designated unsuitable by the application of these criteria. It should be noted that these criteria are based on several statutes generally related to environmental values.

We do not expect individuals or groups, who may be interested in blocking coal development, to be able to use these criteria as a tactical weapon. There is a petition process; however, a *prima facie* showing of unsuitability by the petitioner is required before the petition receives processing.

27. **Comment.** "there is presently no provision for appeal from lands initially classified as unsuitable for mining within the proposed program. One should be provided and it should be drawn in a manner that encourages response and is designed for prompt resolution. Such a plan might be as follows:

(1) Identification of tracts which may be considered unsuitable by BLM
(2) Reasoning-briefly on basis for unsuitability
(3) Publishing of said list to all interested parties and in newspapers of record within area (state and local government, other Fed agencies affected, mailing list of those desiring such information)
(4) Submission of data to support or refute preliminary classification suggested by BLM.
(5) Public hearing on data and conflicts as necessary within 90 days after submission of data
(6) Resolution of status by BLM at local level
(7) Appeal period - 30 days
(8) Inclusion of parcels removed from unsuitability category in remainder of BLM environmental analysis and tract ranking."

Commenter 152

Response. Petitions can be submitted under the SMCRA regulations to have land designated as unsuitable or to have unsuitability designations removed. In addition the proposed planning regulations 1601.6–1(c) provide an appeal process for any decisions made during the formulation of new plans.

28. **Comment.** "First, Wesco has a great concern that many of the decisions that will be made during the application of the unsuitability criteria will be made without a right for an appeal or legal challenge to the final decision. Further, it seems plausible that other bureaucratic decisions will be made during the various steps that will not allow the decision to be challenged. For instance, final guidelines will be applied in the determination of alluvial valley floors and be given the force of law. Guidelines should not be treated or given the effect of law. (See 3–13) The same concern exists for the determination of prime farmlands or for decision as to ability to reclaim.

"Second, Wesco has a major concern with the uniformity with which the established criteria will be applied across the various coal regions of the nation. Because of the forecasted cooperation among state officials, political considerations could prevent wise resource management decisions. Appeals should not be foreclosed when one set of criteria is used to determine leasing one state while a different application of the same criteria could be used to make the same decision in another state."

Commenter 034

Response. Coal developers have expressed a belief that the Department is trying to lock up federal lands with the unsuitability criteria. Other private interests have claimed the criteria are so nebulous that values that are supposed to be protected by these criteria will not be. The Department is reviewing and modifying the criteria in an effort to develop an objective screening process that can be uniformly applied and that protects the values of concern without unnecessarily removing coal from consideration for leasing. The application of these criteria will be a public process as described in the Federal Register, December 8, 1978, pp. 57662–57670, and Federal Register, December 15, 1978, pp. 58764–58774. All parties will have ample opportunity to challenge the decisions during and at the completion of the review process.

29. **Comment.** " *Application to existing Rights* - We do not believe the Department to have the authority assumed in the Program to apply its new 'suitability' criteria to existing but non-producing leases and to the preference right lease applications (PRLAs) now pending before the Department. To the degree that the Program would cancel or nullify an existing lease or PRLA, the taking of a valid existing right may be involved. This issue is currently in litigation, and adoption of this Program element should await judicial resolution of the nature of the rights involved. To the extent that the Program proposes the exchange or substitution of other rights for any so taken, it would appear to exceed existing statutory authority. At a minimum, specific legislative proposals should be addressed and the alternative thereto considered in the final statement."

Commenter 098

Response. The Department has the authority to apply the unsuitability criteria to all federal lands. A new section in chapter 3 and a new appendix (Appendix I) discussing the management of existing leases and PRLAs, and, in particular the application of the criteria to them, have been added to this statement.

30. **Comment.** "While the Department plans to apply land use planning criteria to existing leases, this should be done at the same time as all the other lands are being reviewed. Further, no lease should have a mine and reclamation plan approved by the Secretary until the facility demonstrates compliance with the in-place regional land use plan."

Commenter 118

Response. The Department prefers to apply the unsuitability criteria at the time of general planning. Setting this as firm policy would, however, be extremely unfair to the holders of non-producing existing leases if land use planning is not promptly scheduled in their area, since all existing leases are under a ten year diligence requirement and since they were sold without restriction on how soon they could be put into production. Consequently if planning is not scheduled and a mining plan is submitted, the criteria would be promptly applied during the mining plan review. Existing leases face thorough environmental reviews under the many environmental protection features of the Surface Mining Control and Reclamation Act.

31. **Comment.** "Another area that I noticed was inadequately developed in the Impact Statement was the ranking of unsuitability criteria. While Table 3–1 did indeed list several areas of unsuitability for possible ranking, there was no discussion given to the ways in which those different criteria are going to be intermeshed, which ones take precedence over others, how are they ranked in the over-all system. I think that the idea of ranking sites within a series of industries is a very valuable one, but the ranking system is not as well developed in the draft impact statement as it would need to be really implemented."

Commenter 137

Response. The concept of tract ranking was not, as you observe, described in the programmatic EIS draft fully enough to permit its implementation. It was developed in enough detail to describe the program for the purposes of the Programmatic. In the period between the draft EIS and the final EIS, over twenty task forces have been at work developing the procedural details of the federal coal management program, including the tract ranking process. The results of their work are available from the Department. Some of these additional details are presented in the final EIS. Incidentally, unsuitability criteria are not a ranking factor. If an area is found to be unsuitable under the criteria, it is dropped from further consideration for coal leasing.

32. **"Comment** The preferred program needs to strengthen the unsuitability criteria generally and improve the existing land-use plans (MFP's). This should include a better definition of management tradeoffs of resources vis-a-vis coal development and a commitment to develop land-use and activity planning processes. Better public and agency access is needed to review MFP's before the leasing process is started."

Commenter 281

Response. The unsuitability criteria list to be issued with the final regulations for the coal management program will be improved over the current version as a result of what the Department learns from on-going field tests, as well as language improvements to the criteria to clarify their application and responses to specific public suggestions for improvements to the criteria. Existing MFP's will be improved prior to any coal management decisions through application of criteria and surface owner consultation. The land-use planning carried out by the Bureau of Land Management is undergoing a major change at present as a result of the statement of policy regarding planning on public lands set out in the Federal Lands Policy and Management Act of 1976 by the Congress. This includes clarification of public and outside agency participation in the preparation of plans. The input of the coal management program to the development of policy for the land use planning program of the Bureau of Land Management is limited to setting out the steps needed to identify lands acceptable for further consideration for leasing. The Department is studying further development of the threshold concept in the planning process context, but adoption of formal threshold criteria is not anticipated.

33. **"Comment** *Lands Unsuitable for Surface Coal Mining* At several places in chapter 3 it is indicated that on existing leases, the unsuitability criteria would not be applied until after a mining plan had been submitted. We believe that lessees should be given the opportunity to avoid mining plan development costs until after the unsuitability criteria have been applied. This could be accomplished in several ways. Rather simply, the lessee could advise the Department of his interest in mining the tract, with a request that the determination of unsuitability be completed and made public. *Some controls could* be built in to avoid requests that were not associated with a genuine desire to proceed with mining at an early date."

Commenter 091

Response This proposal was considered and rejected during construction of the preferred program.

PRODUCTION TARGETS

1. **Comment.** "It should be noted that the preferred program is now described as a coal *management* program rather than a coal leasing program. It would appear that one of the most salient features about the preferred program is the centralization of decision-making in the federal government with the resultant control of large elements of the economy of the western United States. The unprecedented degree of management proposed to be employed by the government will, of course, result in a corresponding reduction in the freedom of action on the part of the private sector. The level of new leasing is to be determined by the government's estimate of coal demand on a region-by-region basis. New leasing levels will be established according to such governmentally derived estimates of demand. Furthermore, it is stated on page 3–41 that consideration is being given to imposing upon new leases conditions which specify how, where, or by whom coal would be consumed. It appears that the government is completely ignoring the operation of market forces in the development of federal coal resources.

Commenters 087, 066, 069, 083, 098, and 093

Response. Any good businessman will try to make forecasts about future demands; the Department is trying to do so with the regional target setting process. We wish to offer the amount of lease rights that we can sell. The Congress has declared that we must provide for other activities in conducting our business such as comprehensive planning, the receipt of fair market value, the determination of maximum economic recovery, surface owner protection, and the setting of national production goals and leasing targets. Many of these requirements are of recent origin. Since there has not been an active coal program in the Nation since 1971, none of us is familiar with these provisions in operation . But, just as clearly, these provisions are not created at the whim of the Department but reflect the unambiguous intent of the Congress. In summary, then, we must both enforce the laws of the nation and we must closely

follow the laws of the market for coal if we are to properly conduct our business, the selling of coal extraction rights. In coal, the Department's managing a resource will have a major role in the future economy and environment of the West, but the Department cannot abrogate its responsibilities just because they are important, rather we must redouble our efforts to fulfill them with heightened sensitivity to all who will be affected by the future development of coal.

The term "management" was used because any Federal coal program includes many more activities than just leasing, i.e., administration of lease assignments, readjustments, relinquishments, cancellations, terminations, and transfers, application of planning and unsuitability requirements to existing leases; and the exchange of Federal coal and other mineral leases for environmentally unacceptable Federal coal leases and of Federal coal for alluvial valley floor coal.

2. **Comment.** "*3.1.1.2 - Regional Production Targets* -Perhaps the most troublesome aspect of the statement, and the preferred program itself, is the reliance on regional production targets as the driving mechanism for the program. The establishment of targets in the so-called major production regions' implies that the coal market is cordoned into neat, autonomous market areas. In reality, there are many instances when coal from the West must compete with Midwestern and Appalachian coal, and even coal from Australia and South Africa. To discern in advance, as the preferred alternative proposes, that certain levels of production are desirable in each region simply flies in the face of reality. It will be disruptive in the coal market, impose additional, artificial costs in an already marginal industry, and it would seem to raise serious questions about the federal role in determining the level of economic activity in the various states. None of these issues is raised in the statement.

"Moreover, even presuming the efficacy of setting regional production targets, it is not clear that such targets would in fact serve as the driving mechanism for federal coal leasing. Not only does the statement indicate that the targets set by the Department of Energy would be subject to adjustment by Interior (3.1.1.2), but that such targets could be adjusted according to the available tracts deemed to be suitable for leasing. Section 3.2.3 states that 'the regional ranking and selection process should consistently indicate the optimum tracts for the desired level of development..."

"Previously offered, but unleased, tracts are an obvious indication of market miscalculation and the need to adjust production targets. But the statement implies that, in many cases, the *targets* will be adjusted to meet the number of available, suitable leases. If that is the case, then the production targets serve only as a planning guide, not as the piston for coal lease sales. In any case, the role of the regional production targets would seem to require further description in the final impact statement."

Commenter 069

Response. The Department will rely heavily on the DOE projections, however, the regional targets may be increased or decreased in response to other projections or expressions of interest in specific regions. These composite projections will indicate the demand for coal in a particular area. The land use plans will determine the amount of coal available for development -The supply. In the next several years, the Department believes that with few exceptions, there will be more than enough tracts to meet demand.

3. **Comment.** "Section 3.2.3. (page 3–23) of the Draft Environmental Statement describes a system whereby regional coal production targets would be developed by the Department of Energy. We suggest that the program provide for adequate availability of federal coal leasing so that enough coal is available even if the production targets turn out to be grossly underestimated compared to actual demand. Although the preferred program does provide for industry comment *after* the regional production targets are initially set by the Department of Energy, we believe that industry, including both the coal producers and the coal users, should be more closely involved in the initial target setting."

Commenters 151, 098, 118, and 066

Response. Before the Department of the Interior adopts any regional production goals or leasing targets there will be full consideration given to industry estimates of demand as well as other non-governmental forecasts. There are limits to the Department's authority to involve industry prior to the proposal of the production goals since the

Department of Energy Organization Act (P.L. 95–91) granted DOE authority to propose those goals.

COMPETITIVE BIDDING

1. **Comment.** : Competition is for the most part not realistic as it is almost non-existant especially in L.M.U.

Commenters 110, 019, and 135

Response. The level of competition for any particular tract is often a problem for the Department. We have proposed many measures throughout the preferred program to encourage competition on tracts where it is within our power to do so. Fair market value represents another means for assuring the Department a fair return from its lease sales.

2. **Comment.** "IV. *The Single Tract Sales System and Cash Bonus Bidding Method Should be Used*

"The public interest is best served through the use of the single tract sales system, which results in lower end use costs, administrative efficiency in the planning process and a more equitable comparison of competitive bids. The intertract sale system inequitably forces comparison of bids on different tracts, because adequate consideration cannot be given to tracts, because adequate consideration cannot be given to differences in coal mining, processing, transportation and reclamation expenses.

"The cash bonus bidding method, of the five methods of bidding considered in the preferred program, is best suited to the government's coal management goals. Cash bonus bidding maintains strong incentive for development on the part of the successful bidder. It also reinforces the incentive for diligent development otherwise required by the federal government. Royalty and deferred payment bidding methods, on the other hand, encourage lease speculation."

Commenter 092

Response. The Department recognizes there are certainly operational difficulties with intertract bidding, and we will proceed with caution with implementation. An interagency task force is presently studying the intertract bidding concept. The report of the task force will be made public when completed. Because of ownership patterns in the west, there will be many lease sales in which all who would be lessees would not be on an equal footing in the bidding. This becomes particularly true where a valid pre-existing surface owner consent that is not transferable is involved: Intertract sales, in which several leases are offered in one simultaneous sale, is a means to re-introduce competition into such sales. The promulgation of regulations to govern bidding methods is the responsibility of the Department of Energy. The Department plans to continue to offer tracts by deferred bonus bidding unless the Department of Energy invalidates this method.

3. **Comment.** "Provision for intertract competitive bidding should be deleted from the Program."

Commenter 098

Response. The Department believes intertract bidding is the only way it could conduct a *competitive* lease sale which included tracts where the surface owner gave consent to mine to one company and that consent is not transferable. Elimination of intertract bidding would eliminate those tracts from consideration for leasing unless a new transferable consent is negotiated. The Department intends to support the DOE in maintaining the option of using intertract bidding in selected areas.

4. **Comment.** "It will also be desirable to make sufficient tracts available in order that goals stated in the Draft Environmental Statement such as doubling the 1977 coal production by 1985 (page 1–7) and improving competition in the coal industry through new leasing (page 2–43 and 2–49) can be achieved. The more that coal is made available through federal leasing, the more competitive the coal market will be."

Commenters 151 and 137

Response. The proposed program is designed to insure that sufficient Federal coal resources are available to maintain a competitive coal market and meet national demands.

5. **Comment.** "Similarly, the argument falters that leasing is necessary to increase competition. It is not ever clearly established that lack of competition is a major problem in the coal industry. But if this were a concern of the government, here again, it has numerous means at its disposal by which to resolve the problem. It could, for instance, pursue vertical or horizontal divestiture, prohibit mergers of a certain sort, use the powers established in Section 501 of FLPMA to deny rights-of-way

which would give applicants unfair competitive advantages, make the Justice Department's antitrust review of lease renewals and readjustments mean something rather than the proforma treatment they're given now (See Section 15 of the Federal Coal Leasing Amendments Act of 1976), enforce the provision of the Mineral Leasing Act which bars common carrier railroads from obtaining federal leases, and conduct an aggressive antitrust review when lease assignments arise. Measures such as these would appear to be much more effective means of promoting competition than leasing. As described in the ES, the Interior approach to antitrust if applied, for example, to the steel industry, would not be to break up the giants which are the cause of the problem. Rather it would be to make additional lucrative contracts available to them."

Commenter 060

Response. The Department views competition as a major potential problem. One of the many concerns of the Department in this regard is for the pool of potential bidders for lease sales. Questions of divestiture are beyond the Department's authority, but the Congress in the Federal Coal Leasing Amendments Act clearly had in mind that the Department promote industry competition in carrying out its other leasing duties. The Department is examining the question of rights-of-way control. The Justice Department's review of lease sales has been considerably simplified in the preliminary rulemaking. The railroad holding limits are enforced by the Department, and the Department is examining the question of more tightly controlling the assignment market. The Department would follow all avenues open to it to promote competition.

6. **Comment.** "Section 3.2.4.4 lists several alternatives being considered for sale and bidding procedures for new federal leases. The sliding scale royalty bidding would increase the percentage royalty with the value of the coal. With coal prices expected to continue to rise, this method would probably insure that marginal deposits or small areas of logical mining units would be increasingly by-passed by companies. The profit sharing method would probably be the worst of all worlds for both the government and the operators since the government would effectively have nationalized the portion of the coal mining industry engaged in mining new federal leases requiring an horrendous new bureaucracy.

"The fixed rental method would probably not reflect a return of fair market value to the government over the long term period."

Commenter 066

Response. The Department expects that deferred bonus bidding will be the most common method used for coal lease sales over the next few years: As noted in earlier responses, the Department of Energy now has the authority to promulgate regulations for sale and bidding procedures.

INDUSTRY INPUT

1. **Comment.** "The preferred program for coal development is described in the DEIS generally in Chapter 3. Western Fuels' primary concern with the preferred program involves industry participation in the leasing process. First, the preferred program permits industry involvement which is both too little and too late. As is clear from sections 3.2.1 and 3.2.2, the initial opportunity for input by industry occurs *after* the basic land selection decisions have been made. In undertaking the initial selection of tracts to be considered, the federal agencies take on a heavy responsibility of determining needs and balancing those needs against the numerous other factors impacting decisions to mine coal. In the final analysis, it is industry which develops federal coal resources. Industry's input is both necessary and appropriate at the earliest stages of the planning process. This input must occur prior to initial selection of lands.

"Further, the level of industry input is too small. In the preferred program, only industry 'expressions of interests' are permitted. Western Fuels submits that industry should be permitted to submit nominations, rather than merely expressions of interest."

Commenters 090, 104, 098, 087, 066, 068, 084, 069 and 083

Response. The Department agrees that "industry's input is both necessary and appropriate at the earliest stages of the planning process." This was our position at the time of preparing the draft EIS but was not well explained. This final EIS has been revised to correct for this poor communication. Basically, in land use planning the Department is interested in the general level of activity the private coal developers expect in the area and any special resource information they may have

available that would be important to general planning decisions. We are particularly interested in information that indicates the need to widen our screen for medium and high development potential coal, data to demonstrate appropriate exceptions to the application of unsuitability criteria, and arguments in favor of coal development over other potential uses of the land. The difference between participation in the planning process and in the expression of interest is that between general interest in seeing further coal development in an area and being ready to identify specific potential tracts in contemplation of purchasing a lease and opening a mine. The expressions of interest are expected to have the same level of detail as nominations have had previously. The role of expressions of interest has been more fully described in this final EIS.

2. **Comment.** *Industry Input*

"As now drafted, no timely or meaningful input would be sought from industry to identify those areas of federal coal lands which are most desirable for immediate development. The coal industry will continue to be the developer of whatever land areas are leased (DES 3.1.8, at 3–14). Such input in the land use planning process would serve to focus DOI's attention on those areas which should receive priority review for lease potential. This would be especially important in the early rounds of resumed lease offerings, but would involve no derogation of the Department's other or subsequent planning responsibilities."

Commenters 098, 069, 087, and 066

Response. The Department will be seeking industry input throughout the entire process of land use planning, target setting, tract identification, ranking, and lease sales.

3. **Comment.** "The expressions of interest described in the DEIS at section 3.2.5 are not idle musings of the industry. The expressions of interest apparently must include maps, geologic data, mining methods, proposed transportation system, etc. This data, which can be developed only be expending great amounts of time, energy and dollars, can in many instances be proprietary in nature. Some alteration of the leasing system must be made either to keep the submitted data confidential or to give the entity which develops the data some preference in the leasing of that land. A plan which calls for the submission of substantial data which can be used by one's competitors and does not place one in a preferential leasing status will not evoke substantive industry input."

Commenter 090

Response. The Department believes that the information submitted with an expression of interest should not be held confidential. Competitive sales will not take place where the government knowingly countenances one potential lessee holding information on the federal coal deposit not available to other lessees. The Department will not select a favored bidder for any sale. Private companies must balance the strength of their interest in seeking leasing of a coal deposit against their desire to keep their competitive edge over the federal coal because of the information that they hold. A similar policy will be followed by the government regarding information submitted during general land use planning.

4. **Comment.** "We believe the Final Environmental Statement should not only permit, but specifically provide for, input and use of industry information in the land use planning process. A possible means to this end might be a process similar to the BLM proposed Regional Technical Working Groups in various outer continental shelf areas which will address the entire planning process for OCS leasing. We suggest similar advisory groups could be established for various coal leasing regions, specifically providing for industry representation on each of the groups."

Commenter 084

Response. The recommendation for advisory groups will be considered prior to publishing final planning regulations. It should be noted that the role of industry in land use planning is regarded as very important to the Department and the discussion of land use planning in Chapter 3 of this final statement has been expanded to make our intentions clearer.

PUBLIC PARTICIPATION

1. **Comment.** "Opportunities for Public Input are Inadequate as Proposed. It is appropriate for the federal government to examine reliable, timely forecasting data made available to it by a variety of sources, thus enabling the government to prepare its projection and set its production targets on the basis of the best evidence available. The

importance of such production targets cannot be over emphasized, as forecasting errors would likely result in an imbalance of supply and demand, which could be difficult if not impossible to correct in light of the long lead time now necessary to obtain permits and approvals to open a coal mine. Such information can be obtained by providing the opportunity for the public as well as the federal government to initiate lease sales. In the land-use planning process, too, opportunity for participation of all interested parties is essential to evidence the public's priorities in assessing land use and to improve the quality of decision making.

We therefore urge that the preferred federal coal management program be revised, in line with Executive Order 12044, to facilitate public participation and also to provide for public initiated leasing.

Commenters 092, 074, 064, 019, 135, 131, 058, 170, 166, 097, 076 069, 093, 203, and 138

Response. Public input will be sought twice during the setting of regional leasing targets. The Department will accept expressions of leasing interest for areas acceptable for further consideration for leasing and will respond positively whenever possible. Thus, the public could, under the preferred program, initiate many of the lease sales. Chapter 3 of the EIS is being rewritten to emphasize the Department's commitments to having all parties interested in coal leasing participate in land use planning and activity planning. The final comprehensive planning regulations, which will be issued in June 1979, will make the process for participating in land use planning much clearer.

2. **Comment.** "The land manager is awarded arbitrary powers in the very early stages of the land-use planning process, in the event that new unit resource analysis, socio-economic profiles and planning area analysis, which are all considered to be a part of the MFP's are to be done for an area. There is no provision for public input at this stage."

Commenters 203, 066, 092, and 166

Response. As indicated at 3.2.5.2 of the Draft Statement, a public hearing is provided in order to consider recommendations on the land use plan *before* the final decisions are made. Opportunities for public participation continue throughout the coal management process. The public does not have to wait for formal opportunities to present their views and knowledge to the local BLM land manager. Inputs from the public are welcomed at any time.

3. **Comment.** "CERT is concerned about a few elements of the preferred alternative. First, there is no provision for tribal participation in the program except as a part of the general public. The Department has made a commendable and appropriate effort to include states and localities in decisions concerning federal coal leasing and development. States, however, do not speak for Indian tribes. In fact, they often have interests that are in direct conflict with tribal interests. Many CERT tribes, especially those in the Powder River, San Juan River, and Fort Union coal producing regions are very near and in some cases, virtually surrounded by, land bearing federal coal. Developments of that coal would have a profound impact on the natural, social and economic environments of these reservations. Tribal governments are responsible for managing the impacts of energy development on our reservations. We want and need to coordinate our efforts with the federal program, but to do this we must be directly involved in your planning process.

"Federal agencies, when developing programs, often do not include provisions for the participation of Indian tribes–usually not out of ill-will but merely as an oversight. When that happens, tribes are often ignored and have tremendous difficulty participating in federal agency decisions.

"CERT therefore urges you to make explicit provisions for tribal participation in the program. Tribes should be given the opportunity to participate in the ranking and selection of tracts, setting regional production targets, land-use planning, and assessing impacts. Attached to this letter is a list of our suggested modifications to the sample regulations to allow for active tribal participation.

"Indian tribes should have been given the opportunity to participate in the development of the DES and the preferred alternative. Perhaps the lack of tribal participation accounts for the inadequate treatment in the DES of the significant impacts of the program on those tribes located near federal coal regions. We feel that greater attention should be paid to those impacts in the section on regional impacts."

Commenters 055, 172, 180, 079, 118, 108, 019, 135, 138, 160, 175, 137, 148, and 057

Response. There is specific provision for tribal participation in the BLM land use planning process. The method for accomplishing this participation is in section 1601.4–1 and 1601.4–2. This section describes the methods used to contact Indian tribes and the intent to coordinate BLM plans with land use policies, plans, processes and management programs of Indian Tribes. It should be noted the BLM is only one party and for this process to be productive, Indian Tribes must play an active and aggressive role. The Interior recognizes its trust responsibilities to assist Indian Nations in their land use planning and resource management activities and is prepared to assist any Indian Nation that expresses an interest and commitment to coordinated land use planning.

Strong efforts were made to give Indian tribes the opportunity to participate in the development of the DES on the preferred program. The Denver-based Deputy to the Director of the Office of Coal, Leasing, Planning and Coordination (OCLPC) contacted those tribes with major coal deposits adjacent to large Federal coal fields. Those tribes that expressed an interest in the program were personally visited by a representative of the OCLPC and were briefed on the development of the program. All departmental issue papers were sent to these tribes as they were developed. The Department offered to continue to work with the tribes individually or collectively. No Tribal Government made any request for follow-up coordination meetings.

The OCLPC is presently examining with the commenter and other concerned parties what additional methods there might be to ensure tribal participation in leasing.

Changes have been made in Chapter 5 of this final EIS to recognize the impacts of the various management program activities on the Indian tribes.

Your comments on the regulations have been addressed separately.

SPECIAL LEASING CONSIDERATIONS

1. **Comment.** *"Public Body Leasing*

"The program for public body leasing should be carried out under the supervision of the joint state-federal coal selection and ranking team in each production region. The governor of each state should be allowed to review and approve any lease sale of coal under the public body provisions to a public body from another state."

Commenter 093

Response. The Department intends to provide State governors with an opportunity to consult with the Secretary of the Interior on all lease sales, including public body sales. Additionally, the federal/state regional coal teams will be closely involved in preparing tracts for special opportunity sales.

2. **Comment.** "In section 3.2.6 of the DEIS, the special leasing opportunities for public bodies and small business are discussed. Western Fuels supports this concept but urges expansion of the discussion in the FEIS to include a consideration of the amount of coal land which would be available for special leasing opportunities and the precise procedures which would be utilized."

Commenter 090

Response. The Department plans to make sufficient coal available to satisfy the needs of those firms qualifying for special opportunity sales. The Department believes that this will not represent a major amount of the Federal coal leased in the program. The amount of coal supplied to special opportunity sales but not sold will be offered in later normal lease sales.

3. **Comment.** "Special Leasing Opportunities Provisions are mandated by Section 2 of the Federal Coal Leasing Amendments Act. The present Draft Environmental Statement is inadequate in that it fails to specifically identify such a program. The final Environmental Impact Statement must address this issue or it too will be inadequate."

Commenter 151

Response. The final EISs do adequately recognize the special leasing opportunities provision of the Federal Coal Leasing Amendments Act of 1976. We refer you especially to Section 3.2.7 of the EIS and to subpart 3420.1–4 of the preliminary regulations.

4. **Comment.** "The Draft Environmental Statement (section 3.2.6, page 3–27) and the Example Regulations (sections 3420.1–4(a) (2), page A–11 and 3472.2–2(e), page A–36) provide for a 'special leasing opportunity' in the form of a small business set-aside. The authority for this

special class of bidder apparently is derived from the Declaration of Policy of the Small Business Act, 15 U.S.C. 631(a). There is no small business set-aside provision in the Federal Coal Leasing Amendments Act of 1976 or in other mineral leasing authorities.

"The American Mining Congress fully endorses the policy of the Small Business Act to assist small businesses as a means to encourage free competition in the private enterprise system.

"Without intending to diminish our support for small business, it is appropriate to point out that the authority relied upon in the Small Business Act is open to serious question. In this regard, 15 U.S.C. 631(a) would appear to be directed to the 'sale' of government property, which contemplates the passing of title, as distinguished from a leasehold interest which falls short of complete ownership. Moreover, the Coal Leasing Amendments Act of 1976 indicates the intent of Congress to only create set-asides for certain public bodies.

"One concern can be expressed in the context of the large areas of land that may eliminate from mining during the land use planning stage. An additional exclusion of tracts of the remaining lands acceptable for mining at least has the potential of rendering adjoining tracts uneconomical for mining by larger companies and may seriously complicate the problem of creating logical mining units.

"Assuming that such set-asides are legal, the DES characterizes the amount of land to be set-aside as a 'reasonable number of tracts. It is our understanding that the SBA will determine the number of small mining businesses in a particular area and on that general basis arrive at a figure for the amount of reserves to be set-aside. Although it is not clear how this determination will work procedurally, it is recommended that public and industry input be allowed at the earliest possible stage. Only through such early and continued open discussion of this process can Interior make the necessary selection decisions.

"It is also recommended that the set-aside process be accomplished early in the activity planning stage. While we note that there will be no special determinations of fair market value, maximum economic recovery, diligent development, or other possible financial incentives, DOI has not indicated how the set-aside concept will impact the regional production targets. If these targets will serve to rank and select tracts, early set-aside information is absolutely necessary.

"We would also note that the application of terms such as 'fair market value' and 'maximum economic recovery' may take on different interpretations in the small business context. A fuller discussion of these issues is absolutely necessary.

"Our recommendations generally have equal applicability to the special leasing opportunity offered to public bodies under the authority of section 2 of the Federal Coal Leasing Amendments Act of 1976. This is particularly true with regard to the early and continued opportunity for input from the public, industry, and other interest groups.

Commenters 087, 098, and 034

Response. The Department believes that its statutory, and policy, bases for the small business special opportunity sales are sufficient. We see nothing in the language of the Coal Leasing Amendments Act of 1976 that would foreclose the sale of leases in the small business program.

The Department does not expect that the size of the special opportunity set-aside program will be large enough to have a material effect on the normal leasing process. The Department would run these programs largely on the basis of their public purpose rather than on the basis of satisfying a regional coal target. The probable size of the special opportunity sale for any upcoming schedule will be known at the time that tract ranking, selection, and scheduling begins. Any participants in activity planning and the associated regional sales EIS will be able to comment on the proposed special opportuntiy schedule. In addition, the Small Business Administration requested comments on its definition of small business for coal leasing purposes in Federal Register, March 14, 1979, p. 15514

Fair market value and maximum economic recovery would not take on a separate meaning when used in connection with the special opportunity sales except that in computing these parameters the Department would recognize the unique tax structures that sometimes face such firms, i.e., it would not negate the tax preferences shown these firms.

START-UP CONSIDERATIONS

1. **Comment.** "We need a new MFP to consider such socio-economic disasters, and the Land Unsuitability Criteria need to be changed to

protect our farmland and water. But the impression I get is that we will receive very little protection from the preferred alternative because of the start-up program as described in 3.1.1.8. You plan to lease in our area because it has existing MPF and ES. This is contrary to NRDC v. Hughes, which has already been quoted. It also violates the requirements of NEPA Act, 3.1.1.7, where you state that an environmental statement is needed for Management Framework Plans."

Commenters 165, 144, 176, 203, 145, 148, 167, 168, 156, 038, 085, 172, 097, 063, 155, 160, 157, 164, 124, 108, 107, 105, 038, 089, 130, 111, 061, 076, 088, and 148

Response. The Department has not made any decision to lease coal in any area except under the short term emergency procedures allowed by the *NRDC v Hughes* amended order. Before any new competitive leasing is proposed in any planning area, that area will at a minimum be tested by the unsuitability criteria as updated by the response to comments received on the draft EIS, this EIS, and the proposed regulations and by surface owner consultation. [In addition, the tract identification and ranking process would consider again, the socio-economic impacts of leasing additional coal that would be considered for the ranking process.

NEPA requirements would be fully met by a new regional lease sale EIS which would be written to support this tract delineation, ranking, and election process.]

On March 23, 1979, Secretary Andrus responded to a letter from NRDC which raised many of the same issues concerning start-up considerations as are set forth in this section. See the Secretary's letter. (page 8-77)

2. **Comment.** *"C. 1980 Lease Sale Date.*

"These start-up considerations would not be necessary if the 1980 coal lease sale date was not so rigid. Both the public and the Department would benefit if this leasing date were abandoned so that DOI could take the time to 'do it right' and develop a satisfactory coal policy without frantically trying to meet political deadlines.

"Unfortunately, we are doubtful that DOI will halt its application of the unsuitability criteria and abandon the other start-up considerations. A draft instruction memo from the Director to the State Directors concerning planning for the preferred alternative makes it perfectly clear how important is the mid 1980 lease sale schedule".

Commenters 168 and 281

Response. Start-up procedures are established to allow the best management possible should leasing in the near future be necessary.

The Department has not scheduled a 1980 lease sale. The Department has set the goal of having a coal management program in place by 1980. This program would make it possible to have a lease sale in 1980 if it were determined (1) that the component of the program that determines the need for leasing indicated a lease sale was in order and (2) all the necessary data aquisition and environmental analysis required by the program could be completed. Any lease sale held in the next few years would include all the major coal management program elements of the preferred program. They include application of unsuitability criteria and the tract delineation and ranking and selection process, and a production regional lease sale EIS. During all of these stops there are repeated opportunites for public participation.

SURFACE OWNER CONSENT

1. **Comment.** "Where a consent has been issued, the Department should infer only interest in the tract, and encourage development by offering such area for a lease."

Commenter 098

Response. Tract delineation, ranking, and selection will consider all lands available for mining on the relative socio-economic and environmental merits of developing that lease not on the basis of who owns the private surface rights unless that surface owner is a bona fide 714 (e) surface owner and he has withheld consent or filed a statement of refusal to consent. (A preferred program policy change in this final EIS).

2. **Comment.** Page 3–18; "By designating land, the surface of which is owned by people who oppose surface mining, as suitable for coal development consideration, the local land manager would create a situation where tremendous pressures to consent to the mining would be brought on the surface owners."

Commenter 057

Response. The Department will not identify or rank tracts which include lands owned by bona fide 714 (e) surface owners when those owners

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

MAR 23 1979

Mr. Jonathan Lash
Senior Project Attorney
Natural Resources Defense
Council, Inc.
917 15th Street, N.W.
Washington, D.C. 20005

Dear Mr. Lash:

I have read your letter of February 15, 1979, on the Department of the Interior's proposed Federal coal management program. I cannot concur in the judgments expressed there.

In the letter you state that:

> Despite the court's explicit command to the contrary, the Department has chosen and begun to implement a coal leasing program long in advance of completion of the required Programmatic Impact Statement.

This statement is simply not correct. First, this Department is not even proposing a leasing program. It is, instead, designing a comprehensive coal management program. Certainly leasing would be a component of that program, but it would encompass a whole range of coal actions, including the application of planning and land unsuitability requirements to existing leases; the processing of lease readjustments, relinquishments, cancellations, terminations, and transfers; the consideration of preference right lease applications; and the exchange of Federal coal and other mineral leases for environmentally unacceptable Federal coal leases and of Federal coal for alluvial valley floor coal. Second, and most importantly, not only has the Department not yet chosen a management program, but it will not do so until the final programmatic environmental statement, the comments thereon, and the comments on the proposed coal management regulations have been thoroughly reviewed. Finally, my approval of a coal management program is entirely

separate from any decision on a need for new competitive leasing. The competitive leasing component of that program would most emphatically not be initiated unless and until I decide that there is a need for renewed competitive leasing.

I am particularly dismayed by your statement quoted above because of the special efforts made by this Department to not simply comply with the order in NRDC v. Hughes, but to go way beyond its minimum requirements. All that the order required was a supplement to the 1975 final programmatic environmental statement. Preparing a completely new draft environmental statement was my idea. I chose to do so in order to avoid building on a proposed program which did not reflect the policies enunciated in the President's Environmental Message, the directions I have set for resource management in this Department, and the goals and provisions of the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977.

I made this decision knowing that development of a wholly new preferred alternative coal management program and the preparation of another full programmatic statement would be a time consuming activity. This was not an easy decision given the recent uncertainties in energy supply and the emphasis on coal in the President's Energy Plan. However, I felt no amount of tinkering with the 1975 proposal could ensure the full incorporation of the new statutory and policy directions I noted above.

Having briefly commented on your letter, I will proceed to discuss more fully the basic issues which, as I see it, divide us.

First, I detect in your letter a suggestion that the coal program development efforts are being conducted without my full knowledge and concurrence. Your references to "the Department" and "the BLM" and your request for a meeting directly with me give rise to this inference. If this suggestion was

intentionally made, I wish to promptly dispel it. I take full responsibility for the Federal coal management program. As this responsibility was given to me by the President upon his appointment of me and was explicitly assigned to me by him in his May 24, 1977, memorandum directing me to undertake certain activities in fulfillment of his Environmental Message, I view it most seriously. Either I or the Under Secretary have considered fully every significant policy option put forward in the development of the alternatives and subalternatives analyzed in the draft programmatic statement. I directly monitor on a biweekly basis detailed milestones for the establishment of the coal management program and will continue to make all decisions necessary for the successful completion of a lawful and open coal policy review. To accomplish day-to-day Secretarial level management oversight, I have even taken the unusual step of establishing a special office under the Assistant Secretary, Land and Water Resources, to plan for and coordinate the coal policy review and the work in establishing the program.

It is a difficult and not very constructive task to respond to inferential arguments such as those made in your letter. For the record, however, I will repeat again that I have made no open or secret commitment to resume competitive coal leasing by mid-1980 or any other date. The competitive coal leasing component of a coal management program cannot be implemented until, first, I personally choose a program after reviewing the final programmatic statement and the public comments on both it and the proposed regulations, and, second, if and until I make a separate determination that leasing should resume. In any Department of this size, misconceptions can arise from reading brief excerpts from the great number of intra-Departmental and intra-agency communications. Despite whatever inferences may be drawn from those communications, none of the decisions I discuss above will be made until June 1 at the earliest. I am confident the Department is fully complying

with the letter and spirit of the amended court order. The Department is, in short, properly completing the "EIS process before (your emphasis) it adopts, let alone implements, a new program be it EMARS II or any other".

The issue which is discussed in greatest detail in your letter is the relationship between the Hughes order and the ongoing field tests of the unsuitability criteria in selected planning units. Concerning that issue, I bargained for and the Court approved the right of the Department to do any coal-related planning which does not delineate, select, or otherwise focus on particular tracts. The order allows the Department to continue land use planning efforts, revise or alter existing land use plans, and conduct studies of new planning standards. I am, therefore, satisfied that the Department has rigidly adhered to the order in its field test application of unsuitability criteria.

In part, the opinions you express in your letter would seem to be based on a misunderstanding of the purpose of identifying a preferred program alternative. The preferred program in the draft programmatic statement represents the program I would have selected last summer based on the information then available and without the benefit of the environmental impact analysis in the statement. As you will recall, one of the principal criticisms of the 1975 programmatic statement made by the plaintiffs in NRDC v. Hughes--a criticism with which the court concurred--was that EMARS II, the proposed program, was not sufficiently detailed to provide an understanding of how it would function if it were adopted. To remedy that defect, I asked that a fully detailed preferred program alternative be developed and presented in the new draft programmatic statement. Now, largely as a result of providing a high level of detail to all interested parties, we are the subject of criticism that the Department has overcommitted itself to a program. I have already said this is not true. In no way do I feel bound to the preferences I expressed last summer.

I have already agreed, and the Under Secretary has officially concurred on my behalf, to several changes in the preferred program alternative which will appear in the final programmatic

statement. These changes resulted from review of some of the comments on the draft statement. I am confident that additional, major changes will be made after review of the comments on the final statement and on the proposed regulations. As your letter particularly addresses the unsuitability criteria, let me assure you that, when I make my decisions on the coal management program, I will not be bound by the existing preferred program proposal. I will, instead, fully consider the appropriateness of the concept of requiring the initial application of unsuitability criteria in the land use planning process, the proposal to place the criteria in regulations, and the language of each criterion. I will not commit this Department to a multi-million dollar, multi-year principal feature of the preferred program without careful consideration. I certainly will not do so simply because the Department will expend limited amounts of funds this fiscal year to improve land use planning so that the coal leasing component of a Federal coal management program can be implemented promptly if I determine on or after June 1 that competitive leasing is needed. If changes need to be made in the unsuitability criteria or the manner in which they are established or used, they certainly will be made.

On the other hand, I will also not commit this Department to this decidedly innovative feature, whether as proposed now or changed, unless I am confident of its value and am assured as to the manner in which it will work. The only way to obtain the necessary level of confidence is to field test the unsuitability criteria as we are doing. As you know, these criteria are highly controversial. Many who have commented on them have expressed concern that they are not sufficiently stringent, but at least an equal number have stated that they are far too stringent. I, certainly, will not make a decision on the proposed criteria and on how and when they should be applied until I have a good idea of which, if either, position is correct. The application of those criteria now in certain land use planning efforts will provide me with sufficient information to make the necessary informed judgment.

It is not at all surprising to me that the agency officials who have responsibilities for running the Department's land and resource management programs as effectively and efficiently as possible have used as an assumption for their future budget and work planning

that the preferred alternative would become the Federal coal management program (nor that they may have occasionally slipped from the use of the future perfect subjunctive tense that the lawyers would have preferred they use). I would be deeply disturbed if such planning were not taking place. If it were not, we could find ourselves either lacking the funds and the personnel to implement whatever program I choose or seriously endangering other programs by drawing off the necessary funds and personnel to assure that implementation. The basing of management planning on the preferred alternative is obviously an appropriate decision for the agency officals to make as the proposed action or preferred alternative is, normally, the most likely outcome of the environmental impact statement process. Such contingency planning work, however, should not and will not commit me to choosing the preferred alternative coal management program.

I will continue to aggressively seek to develop an environmentally sound coal management program which meets the goals of both the President's Environmental Message and his Energy Plan and to do so in full compliance--in fact, more than full compliance -- with the NRDC v. Hughes opinion and order. I believe the chances are extremely good that this task will be a success. I certainly hope that, when success is achieved, you and all citizens who support environmentally responsible domestic energy production efforts will join me in welcoming and celebrating it.

I am grateful for this opportunity to exchange views on the critical issues concerning the management of federally-owned coal. Should you wish to meet with me to discuss further the development of the Federal coal management program, I would be happy to do so. I suggest any such meeting include representatives of those groups who, with you, co-signed the subsequent letter dated February 16, 1979.

Sincerely,

Cecil D. Andrus

Secretary

have filed statements of refusals of consent. The Department will not propose to lease any tracts for surface mining which include bona fide 714 (e) surface owners' land unless their consent to mine has been obtained. The refusal to consent procedure and the removal of the exception which permitted the holding of a lease sale even where consent had not been given are preferred program policy changes made in this final EIS as a result of these comments.

3. **Comment.** *"Implementation Schedule Preempts Proper Planning"*

"While the principle is sound, the execution of that principle, as proposed, misses the mark and misses so badly that the principle is lost. The problem with the preferred alternative is the rapid implementation schedule, which calls for lease sales in 1980, timed to occur before the November elections. This creates massive problems in all program areas. For example, this does not allow enough time for the District BLM offices to put into effect the new land use planning system.

"Instead, adoption of the real, preferred alternative is put off and the 'start-up considerations' (p. 3–28) phase is substituted for up to 15 years, according to the proposed planning regulations (1601.6–3(c)). This substitute is nothing less than the activities done under the old system, EMARS (Energy Minerals Activity Recommendation System), dusted off and injected with life again."

Commenters 154, 058, 061, 130, 173, 165, 203, 202, and 179

Response. The Department has not decided to conduct lease sales in mid-1980, but it is maintaining that option. It is unrealistic to assume that federal land use decisions should be held in abeyance until new land use plans could be generated. Congress recognized this when both the Federal Land Policy and Management Act and the National Forest Management Act were enacted by validating existing land use plans. The methods used to identify potential lease tracts in both the start-up phase and the mature program are totally unrelated to previous decisions based on the Energy Minerals Activity Recommendation System.

4. **Comment.** "The mid-1980 lease sale target date effectively implements much of the EMARS planning process by necessitating reliance on existing land use plans and industry nominations."

Commenters 061, 130, 154, 058, 173, and 165

Response. First, the Department is not committed to a 1980 lease sale, it is committed to having a process in place that could accomplish leasing in 1980 if it was determined to be needed. Second, the Department is not proposing to lease previously identified tracts. The Department is proposing to update some BLM plans developed in accordance with its multiple use planning regulations by applying the unsuitability criteria described in the draft statement. This update would identify areas suitable for consideration for coal mining. From this point, the activity planning process would be initiated. The first step of this process would be tract identification. It should be noted that this tract identification will occur after environmental, social-economic, and surface-owner consultation steps have been completed. These tracts may or may not be similar to tracts previously identified by industry. It will be very likely that many will have been previously identified since as much as 85% of Federal coal lands with high development potential have been previously nominated. To claim that the Department is implementing the EMARs program because it may propose to lease lands that were proposed for leasing during that program is irresponsible.

5. **Comment.** "Since there is no provision for override of the surface owner's decision on the final lease, it should be presumed that no opportunity for override in the planning process is allowed either.

"A consistent interpretation and application of the Surface Mining Control and Reclamation Act is called for."

Commenters 057, 189, 146, 171, 013

Response. The Department is requesting comment on the following policy. The consultation and consent processes should be kept separate. However, during the consultation process, the Department would remove any land from further consideration for leasing if the surface owner of that land is a Section 714 surface owner and if he indicates on the consultation form that he has not previously consented to surface mining and that he firmly intends not to consent during the life of the plan. After the surface owner consultation screen has been applied and the local land manager (i)

has determined each general area in which a significant number of surface owners have expressed a preference against leasing (preference areas) and (ii) has made a determination concerning the removal of those preference areas from the areas which the land use plan will identify as acceptable for further consideration for coal leasing, the disclosure of firm intent not to consent (firm intent disclosure) would be considered.

Those specific lands covered by firm intent disclosures which are within the preference areas removed from further consideration for leasing would be noted in the plan. Those specific lands covered by firm intent disclosures which are not situated in the preference areas removed from further consideration would also be removed from any further consideration for coal leasing in the land use plan.

As a consequence of these procedures any land covered by firm intent disclosure on the consultation form (within or outside of preference areas removed from further consideration for coal leasing) would not be considered for coal leasing again for the life of the land use plan unless the ownership of the land changed, either the new owner is not a Section 714 surface owner or he is and is willing to file a written consent to surface mining, and the BLM decides to proceed with a plan amendment.

6. **Comment.** "All consents which have been given prior to the activation of the program, and which are non-transferable, must be respected as such. Second, after the initiation of the program, consent should not be required to be transferable."

Commenter 118

Response. The preferred program explicitly recognizes pre-existing consents. Transferability is required of new consents to ensure competitive lease sales in accordance with the Federal Coal Leasing Amendments Act of 1976. Consents are legal contracts and should be enforcable no matter who is party to them. The preferred program does specify that consents are to be individually negotiated between surface-owners and the coal company without government involvement.

7. **Comment.** "The DES does not adequately address the validity of surface owner consents obtained by coal companies after the date of the Surface Mining Control and Reclamation Act and before final publication and implementation of the Coal Management Program.

" We believe that the transfer of any surface owner consent from the company holding such consent to the successful bidder at a lease sale should be based on the cost of acquisition of the consent plus recovery of overheads normally allocated to capital acquisitions.

'If a tract is offered for lease under the exception which permits the Secretary to continue a tract in a lease sale without the prior filing of a surface owner consent, the successful bidder should be allowed a sustained period of time in order to obtain such consent."

Commenters 096 and 189

Response. It is not the Department's intention to penalize companies who have obtained a consent after the date of SMCRA and before final publication of coal management regulations, at the same time the Department wishes to avoid any potential bidder's gaining a competitive advantage. Thus, such consents must be transferable unless the company can demonstrate to the satisfaction of the Department that their consent will not be used to discourage other potential lessees from participating in a sale. A statement that the consent will be assigned without extra cost to whomever would be the successful bidder would be sufficient.

The Department is considering recognizing the carrying costs of a consent in providing for the compensation of the party originally obtaining the consent. Further comments on this policy are solicited. The Department considered requiring reimbursement of the administrative costs of acquiring consent as well as the direct costs of the consent. The idea was discarded because we could not visualize a fair means for establishing what the administrative costs of consent acquisition actually were. Thus, the Department decided that opening the reimbursement process to recover administrative costs had just as much potential for reducing competition as the scenario referred to in this comment. The Department has included other safeguards in the delineation and surface owner consent processes to counter the tendency to only sell tracts in which few bidders could be expected to be interested. The delineation process will design tracts that maximize competition by taking into account what is known about ownership and consent process required complete disclosure of the content of surface owner consents and of any

knowledge of surface owner consent that might affect the sale.

The Department would not continue a tract past sale notice without evidence of written consent. This represents a change in policy as a result of comments on the draft EIS. This exception is certainly valid under the letter of the law (Sec. 714 prohibits leasing, *not* holding lease sales, unless consent is obtained) and is excellent public policy from a land use and resource planning perspective. However, numerous comments have been received by parties most concerned with the surface owner consent provision of SMCRA all of which suggest that the exception violates the *purpose* and *spirit* of that provision. Once the lease sale is held, according to the commenters, it will at least appear that the industry and BLM have jointly decided the coal should be mined and have "joined forces" to obtain consent. The commenters maintain that, even if this impression is not given, this exception would still have the inevitable impact of placing heavy pressure on the surface owner to consent to surface mining—pressure of the type the proponents of Section 714 had hoped was foreclosed by that provision's enactment.

8. **Comment.** "An unnecessary restriction is the provision for allowing the surface owner to have final or irrevocable veto power over the leasing of federal coal. The checkerboard pattern of coal land ownership so common in many parts of the west further complicates the problem."

Commenters 017 and 019

Response. The surface owner protection feature to which you are referring is spelled out clearly in the law, Section 714, Surface Mining Control and Reclamation Act. The Department has in no way expanded on the protection granted by the Congress to a certain class of surface owners whose lands overlay Federal coal.

The complex pattern of land and coal ownership does complicate the management of the Federal coal management program. The Secretary's authority for handling land ownership is limited.

9. **Comment.** "I understand now that the government is in the process of proposing to increase its royalty in the coal realms even though it underlay surface owned by others to two dollars and a half a ton, so whatever the government might have to recover in these mining ventures—it is protected. The surface owner has no royalty at the present time to come to him to assure him anything to replace what can and what will happen in operations of the kind I have just mentioned."

Commenter 128

Response. The royalty payment is payment to the public for the right to extract the coal resource on public lands. At present, Congress has directed that 50% of this royalty be returned to the state in which it originated with priority for the use given to the local governments socially or economically impacted by the coal mining. The overlying surface owner is also directly protected from damages done by coal mining under the law. In the case of surface mining, for the special class of surface owners defined in Section 714(e) of the Surface Mining Control and Reclamation Act of 1977, most farmers and ranchers, the Secretary must have written evidence that the owner of the overlying surface has consented to mining. In the case of underground mining, on the other hand, the overlying surface owner may negotiate directly with the coal company for compensation or the company may be required to post a bond against damages to the surface owner's property.

10. **Comment.** "The manner in which such consultation is actually being carried out at the present time differs in some respects from the preferred program, and to the extent that our interests may be affected."

Commenter 096

Response. BLM State Offices have used different forms to conduct surface owner consultation. The results of these experiences have been compiled and a report prepared recommending the consultation procedures the Department should adopt. The Department has decided that the consultation process and the consent process should be clearly separated because of their differing objectives. Consultation aims at making a recommendation for or against surface mining in the area; consent aims at discovering whether individual surface owners will agree to surface mining on their property. The Department will attempt to conduct consultation and then gather consent statements. The final consultation may be expanded to include questions regarding whether consent has been previously granted and requests that, when appropriate, respondents identify themselves as qualifying under Section 714 of SMCRA.

11. **Comment.** "The surface owner that does not qualify pursuant to Section 714 of the Surface Mining Control and Reclamation Act of 1977 for the considerations therein mandated by Congress ('nonqualified surface owner') should not be allowed to distort the competitive bidding situation."

Commenter 092

Response. "Non-qualified surface owners," including coal companies owning surface, are protected under the Mineral Lands Leasing Act of 1920. Such surface owners are protected against damages, but do not have the right to block entry to the mineral estate as do surface owners who qualify under Section 714 of SMCRA. Such a surface owner cannot block entry.

We interpret Section 714 to mean that consultation must take place during land use planning. Its purpose is to identify areas where a significant number of surface owners prefer to have no surface mining on their lands. Consultation after ranking would not meet the intent of the Congress.

12. **Comment.** "We would like to see a mandatory surface-owner consent screen during the land-use planning process to be included in the area's management framework plan."

Commenters 171, 057, 128, and 198

Response. In response to these comments, a procedure has been added to the preferred program to permit a Section 714 surface owner to file at any time during activity planning a letter with the BLM district office stating that he will *not* give consent to surface mine his land. If such a letter is filed that land will not be considered available for leasing until the ownership changes or a new land use plan is prepared.

Consent *to* mine involves a contractual agreement between the landowner and coal developer or broker. The Department does not believe it is appropriate for a governmental agency to enter into negotiations that set a price for surface rights that would be purchased by a private party. Therefore, the Department will not seek the consent to mine from land owners during surface owner consultations or at any other time.

13. **Comment.** "What will happen in the event the surface owner should refuse to give his consent."

Commenters 128, 037, and 146

Response. A Section 714 surface owner has the absolute right to refuse entry to surface mine beneath his land for coal. No Interior authority can abridge that right.

14. **Comment.** "The National Wildlife Federation is concerned about the current proposal for surface owner consent in the preferred alternative. The major deficiency is that the BLM may proceed with the selection, delineation, and ranking of tracts, and may even proceed to the point of lease sale prior to industry's soliciting the consent of the surface owner."

Commenter 160

Response. A Section 714 surface owner could file a statement during activity planning with the BLM district office stating he will not grant consent to mine on his land. The BLM would then exclude this land from consideration for leasing for surface mining until ownership changes or a new land use plan is prepared. This refusal to consent policy is a change made as a result of public comment.

15. **Comment.** "Surface owner consultation is a wonderful concept, but, unfortunately, has been rendered totally meaningless by the statement."

Commenters 203, 057, 128, 092, and 198

Response. A Section 714 surface owner has the absolute right to withhold consent to surface mine on his land. No local manager or any other Interior official has the authority to abridge that right. No lease sale will be held where Section 714 surface owner land is involved prior to a filing of surface owner consent. The statement referred to concerns for surface owner consultation, a statutorily required activity very different from surface owner consent acquisition. As a result of this and many other similar comments text has been added to Chapter 3 of this final statement to explain more clearly the distinct statutory differences between surface owner consultation and surface owner consent and to spell out more precisely the procedures for each.

16. **Comment.** "A negative response from a surface owner as to whether or not he/she wants to lease his land has the effect of a non-binding response."

Commenter 099

Response. A change in the final EIS, based on comments received, makes a negative statement

on consent to the BLM from a Section 714 surface owner binding.

17. **Comment.** "There are no provisions in the preferred program or the sample regulations which protect the surface owner from harrassment or from incomplete, inaccurate or misleading information by 'the industry' representative who solicits the written consent. A surface owner is ultimately assured greater protection, or at least a greater opportunity of redress, in cases of abuse and harrassment when the responsibility rests with the government not 'the industry.' The preferred program creates an atmosphere which encourages harrassment of the surface owner. Even under those circumstances where 'the industry' is presenting the surface owner with complete and accurate information which is not misleading, the surface owner under the preferred program is defenseless against persistent requests by 'the industry' to sell leases despite repeated negative responses."

Commenters 099 and 061

Response. The arguments you raise in favor of having the government negotiate for surface owner consent were considered when we made our decision that industry should negotiate directly with surface owners. The Department felt that it was unwise to become directly involved in a process that is basically a transaction between two private parties. We have removed the provision that would have allowed the BLM State Director to continue a tract lease sale without consent and made several other changes aimed at avoiding "harrassment" of surface owners.

18. **Comment.** "How would the Department proceed to convince the surface owner that it is in his best interest to allow the Federal coal to be developed?"

Commenter 198

Response. The Department would make all the information on hand affecting the surface owner decision available so that the surface owner could make his decision based on full knowledge of likely future outcomes. The Department has decided that industry ought to negotiate with surface owners for consent. The Department does not seek to "convince" any one of the parties to a consent as to what may be in his best interest.

19. **Comment.** "Section 3.3.4 suggests that in dealing with split estate leasing the Secretary would attempt to regulate the amount of compensation paid for surface owner consent through some vague notion of fair market value while publicizing all consents."

Commenter 066

Response. It is assumed that if a surface owner asked for compensation above market value, he would be less likely to find a buyer. Also, the Department does not forsee the availability of coal to be so limited that the cost of surface consents in general could be escalated to unreasonable levels. In any event, the Department will continue to follow the Congressional requirement that it obtain fair market value for the coal it leases.

20. **Comment.** "We recommend that the Department delete from the Preferred Program the provision on pages 3–25 that provides that tracts not be offered for sale unless included in an intertract sale if a pre-existing consent is determined to be non-transferable."

Commenter 068

Response. The Congress has directed the Department to make coal available through competitive lease sales. The emphasis is on competition. The Department does not believe this directive could be met by conducting the sale as recommended above.

21. **Comment.** "The Secretary's preferred coal leasing program fails to recognize the equality of the surface and mineral estates."

Commenter 074

Response. Surface and mineral rights are not always equal. The Department lacks the authority to lease land for surface mining where surface owners as defined by Section 714 of SMCRA have not provided consent to the development of Federal coal resources under the surface. The Federal government can lease coal under a non-Section 714 surface owner without his consent after compensation or promise of compensation is provided.

22. **Comment.** "We were told that the surface leases taken years ago were still considered consents, no matter what the circumstances, and that our land would be included in any planning done for leasing. They said any other considerations on the leases would have to be settled in court. By the time the surface owners in my area

discovered that the things they had been told when they leased were not true, the time delay and the time to go through the court process made it very doubtful that anything could be done."

Commenter 188

Response. The consent to mine privately held surface is a contract between that surface owner and the coal developer. The Department does not have the authority to nullify a contract between two private parties.

The Department will recognize consents given prior to the passage of the Surface Mining Control and Reclamation Act as required in that Act. If these consents are not transferable, the Department would only consider putting those up for bid in an intertract lease sale.

23. **Comment.** "Some suggestions for an improved Federal coal management planning process include removing the broad discretionary powers of the Bureau of Land Management in determining areas unsuitable for leasing by setting strict rules and guidelines. In the proposed lands unsuitability criteria, the exceptions to the criteria and the broad powers of discretion in application of these exceptions render them meaningless. The Department should have a clear, strict set of rules for soliciting and subsequently utilizing local public participation from the beginning to the end of the planning process. This participation should begin with the Department, not industry, being responsibile for acquiring surface owner consent. Surface owner consultation on Page 3–21 should be conducted by the Department prior to rather than during the planning process, and it should not be just another screen for identifying lands that should not be leased. Surface owner consent should be the foremost provision of the lands unsuitability criteria. If the Department fails to obtain the consent of a surface owner to lease at the outset of planning, then that land should be removed from further consideration."

Commenter 105

Response. The Department believes it is necessary to maintain flexibility in the application of the unsuitability criteria. This flexibility is needed because of the unique difference between the various environments in which coal might be mined. Criteria are designed in a way to protect the values considered in the criteria but not unnecessarily eliminate coal from consideration for mining. If mining could be conducted in a way that would not damage the values covered by the criteria, the land could be considered for leasing. The public would participate in this process as set out in planning regulations and procedures.

We can see no benefit from conducting consultation prior to general planning. The Department of the Interior's proposed coal management program can be divided into two major planning steps. The first is the general land-use planning for all of the resources, including grazing, timber, recreation, wildlife, mineral, etc. The second step is the activity planning stage which relates specifically to one resource, coal. During the first level of planning, the Department of the Interior will conduct surface owner consultation and will ask surface owners to state their preferences for or against leasing. The Department is considering a policy whereby if the surface owner states a preference against surface mining of his land and he is a surface owner as described in Section 714 of the Surface Mining Control and Reclamation Act, that land would be excluded from the activity planning steps. For those areas where the land owner has stated a preference in favor of surface mining or has not stated a preference, those lands may enter into the tract identification and ranking process depending on the outcome of the other screens applied during general planning. We do not understand the comment "just another screen" since these are the most important steps for identifying lands acceptable for further consideration for leasing during the general planning process. The Department has carefully examined the options for obtaining surface owner consent and has determined that this consent should be negotiated by the two parties that must reach an agreement on the terms of that consent, industry and the surface owner.

24. **Comment.** "The Secretary's preferred coal leasing program has taken a timid approach to coal leasing when an aggressive approach is in the public interest."

Commenter 074

Response. The Department disagrees with the conclusion stated above. The Department is moving aggressively to end the moratorium on Federal coal leasing and put into effect a program that will lease the amount of coal needed to meet national demand. It must be recognized that the

application of unsuitability criteria and the land use planning regulations is not an indication of timidness, it is an application of the law of the land. Coal development is an integral part of the national goals, however, it must be consistent with national environmental and socio-economic goals.

The coal program has not been developed anticipating wide-spread opposition to mining by surface owners. The surface owner consultation and surface owner consent steps are required by law. They are accomplished at times in the planning process consistent with the guidance given in the SMCRA.

POST-PROGRAMMATIC ES STRATEGY

1. **Comment.** "EIS Strategy. In response to a question by Peabody at the 3 January 1979 public meeting in Denver on the DES, Assistant Secretary Guy Martin and other Department officials indicated their 'hope' that EISs would not be necessary at the mine plan stage. It was explained that the Department intends to prepare a 'good enough' regional sale EIS to anticipate the site-specific impacts on each lease. We do not believe that is possible. As several industry representatives pointed out at the same meeting, it is impossible to propose a mining plan, reclamation, or even ancillary facilities until it is possible to obtain more definitive coal resource information necessary to do engineering and reclamation planning but which is unavailable prior to actual leasing. There is considerable NEPA case law which indicates that significant technical changes in proposed actions between regional or programmatic EISs and site-specific are legally sufficient to trigger site-specific EISs. Such impacts as hydrological impacts, air quality, water quality, subsidence, and other equally fundamental impacts all depend on site-specific mine and reclamation plans. The different natures of the Federal actions and alternatives involved at each level also strongly indicate the need for separate EISs. For example, at the regional sale EIS stage, the Department is evaluating how many and which tracts to lease on a regional basis; the alternatives analyzed at this point include different tract rankings and lease conditions. At the mine plan stage, however, the decision is the approval (for Federal lands only) of mining and reclamation plans; the alternatives evaluated at that point include approval or disapproval, approval with conditions, and various technological environmental mitigation measures which are clearly beyond the scope of any regional sale EIS."

Commenter 097, 281, and 099

Response. The need for environmental impact statements on mine plans would be considered on a case-by-case basis. Environmental assessments will be prepared for every mine plan submitted. We believe that the effects of a mine can and should be indicated at the time the regional lease sales EIS is prepared in sufficient detail to permit a thorough and meaningful examination of the impacts of the actions before a lease decision is made; whether the detail is sufficient to make a full EIS necessary upon mine plan review can only be determined in each instance when the mine plan is submitted. The Department will not make a firm commitment one way or the other until we have operational experience with the coal management and mining plan approval systems.

2. **Comment.** "Another area of concern could be classified as the regional impact statement and its relationship to this programmatic. Other speakers have mentioned the Star Lake-Bisti Region. I have trouble following the rationale which would allow a regional impact statement to be part of a national program if the national program is not implemented as yet. There seems to be a problem with the timing more than a problem with the framework in which BLM is trying to make their decision making. With the Star Lake-Bisti you have an impact statement which is addressing two right-of-way applications where there are on the order of 15 mining claims being considered, thus the regional coal impact statement is not specifically addressing the regional coal development. I think that were the Star Lake-Bisti statement, the final one on the Star Lake-Bisti, it should be delayed until the Federal coal management program was implemented. I think that many of the inadequancies of the Star Lake-Bisti document could be cleared up."

Commenter 137

Response. Should the Secretary determine that new leasing is appropriate in any of the regions described in the Programmatic EIS, new regional lease sale EISs will be prepared analyzing these new proposed actions and their site specific and cumulative impacts. Data developed in con-

nection with the presently on-going regional impact statements, such as Star Lake-Bisti, will be used in the new regionals as appropriate. This and similar statements will not be used to fulfill NEPA requirements for new competitive leasing. They are being completed on a schedule apart from the programmatic because of the need to do NEPA analysis proposals to mine existing leases and take other non-leasing actions.

3. **Comment.** "In Section 3.4 there is a brief discussion of numerous on-going studies which are described as clarifying procedural details and which will apparently not be the subject of any further impact statements. Although the Department is not encouraged to increase the number of impact statements for any reason, it is felt that these studies are so important to industry and other public interests that failure to at least provide an adequate public comment period for them could seriously jeopardize the legal defensibility of the entire Federal coal leasing program as well as result in an inequitable situation in which parties most knowledgeable in the areas specifically being studied would not be given the proper opportunity to influence the decisions of the Department."

Commenter 066

Response. These studies, for the most part, are to simply detail procedures in any coal management program selected by the Secretary. Few, if any, of the studies' results would likely produce significant environmental impacts separate from the policies and procedures which the detailed procedures would implement and which are fully analyzed in this final statement. Moreover, most of the task forces' work is already reflected in the proposed regulations in Appendix A and changes in the text of this statement. Any additional task force results which are considered significant will be made available for public comment.

4. **Comment.** "Page 3–6, Section 3.1.1.7, paragraph 3 of the Statement indicates that EISs will be prepared for each MFP completed by BLM (coal and non-coal related). Is this statement correct or does it refer to the regional lease sale environmental impact statements? The issue of preparing EISs on land use plans was previously discussed during public hearings on BLM's Wilderness Inventory Procedures, and it was determined at that time that this requirement would be excessive (especially since the public is involved in the planning process)."

Commenter 013

Response. The statement is correct. BLM has stated in their proposed rulemaking for planning "approval of a resource management plan is considered a major Federal action significantly affecting the quality of the human environment. The environmental assessment of alternatives and the proposed plan shall be accomplished as part of the resource management planning process and shall be documented and filed as an environmental impact statement." (43 Federal Register 58769, December 15, 1978). We have described the coal management process as it relates to other processes that will be in effect at the time the program might come into being rather than processes we believe are fairly certain to be outdated. Text has been included in Chapter 3 of this final EIS comparing the resource management plan (RMP) and MFP processes.

5. **Comment.** "The Draft Statement does not provide any mechanism for coordinating the studies required under the preferred program with studies that will later be required by OSM or USGS as the lessee attempts to develop a mine. The potential for wasteful and expensive duplication of effort is high. The preferred program alone contemplates the preparation of four different environmental impact statements prior to leasing."

Commenter 083

Response. The program as described involves the BLM, USGS and OSM. It is an integrated program. The Department is actively seeking means to streamline the coal management function. Among other things, the Department has established an interagency task force to study means of making more efficient, less costly, and more effective the data gathering tasks at each step of the coal management program.

6. **Comment.** "Page 3–41: The discussion of compliance with the provisions of the National Environmental Policy Act is troubling for the same reasons that I have set out above. While the plan is to provide a two-level system of Environmental Impact Statements, one national and interregional and one site-specific and intra-regional, both applying the provisions of the Federal coal management program, compliance with the Act is threatened by the preparation of the Star Lake-

Bisti Statement and the commitment of resources which will be the inevitable result of approval of that statement. Unless the final statement on this area is delayed and modified to comply with the final Federal coal Management Program serious questions about the Management Program and its compliance with NEPA are raised."

Commenter 057

Response. No new competitive leases will be made unless a new regional lease sale EIS is written and the leases are in compliance with the proposed regulations in Appendix A.

7. **Comment.** "The Program should expressly include and provide a Departmental undertaking that EISs under NEPA will not normally be performed upon a lease offering."

Commenter 098

Response. NEPA requires an EIS on major Federal actions, and the Department must do one for lease sales that meet the statutory standards.

MAXIMUM ECONOMIC RECOVERY AND FAIR MARKET VALUE

1. **Comment.** "The proposal to define maximum economic recovery as 'collective profitability' would increase the cost of coal to the consumer by requiring the recovery of coal that the prudent operator would not otherwise mine. It would be preferable to continue the U.S. Geological Survey's current vigorous enforcement of the Congress' mandate to ensure maximum economic recovery, as the Office of Surface Mining has chosen to do in its proposed surface mining regulations, rather than to increase the consumer's costs by adopting the present proposal.

"Furthermore, maximum economic recovery as proposed could require production of coal that the consumer cannot readily use because it fails to meet quality specifications for boiler design, or to otherwise fulfill contract requirements for the market's coal needs. Finally, the impact of the definition as proposed would be counter-productive to achieving the domestic priorities set forth in the President's recent State-of-the Union message, and contrary to his pertinent reflection, expressed in that message, on the advantages of letting the competitive market, rather than government, control industry performance."

Commenters 092, 083, 078, 106, and 087

Response. The definition tentatively selected by the Secretary is to calculate maximum economic recovery on the basis of all seams in land with consideration for social and environmental costs. The purpose of MER is to maximize the coal recovery from mines and thus to minimize overall surface disruption. A task force developed an operational process for this definition that basically computes the profit maximizing level of output for each seam. Thus, company profits would not be threatened nor the cost of coal to the consumer raised. Instead the Government would, on a case-by-case base, accept a lower recovery of its coal on more costly seams to avoid external environmental and social costs. Because the economic evaluation would be carried out seam by seam, where coal in a seam is unmarketable MER will not force the company to extract it. A task force is presently studying methods of determining MER in accordance with the Secretary's preference plus at least two other alternatives. At the request of the Council on Economic Advisers, the task force will also do an economic analysis of the alternatives. The report of the task force will be considered by the Secretary when he makes his final decision on the coal management program.

2. **Comment.** "Requirements for provision in the lease for a determination of specific levels of 'maximum economic recovery' should be deleted from the Program."

Commenter 098

Response. The law directs the Department to require maximum economic recovery.

3. **Comment.** "The intent of the definition of maximum economic recovery contained in 3.3.6 is a good one. Minimization of surface disturbance is a sensible objective in both surface and underground mining. By limiting the area of surface disturbance, conflicts with other values and land uses, especially those associated with wildlife, can be minimized. But the desire to achieve maximum economic recovery cannot be the absolute, overriding, dominant concern. The definition of maximum economic recovery needs to be tempered with a common sense qualifier: The seams that are recovered within the scope of this collective profitability test must be marketable. The seams that are recovered within the same deposit are not necessarily homogeneous. The diversity in quality of the coal can be such that one or more of the

seams may not be marketable end-use due to the poor or aberrant quality of the coal. An additional qualifier is that maximum economic recovery should be based upon coal recoverable from current, existing technology."

Commenter 093

Response. The maximum economic recovery process has been studied by a special Departmental task force, and a report on this task force's efforts is expected to be available by March, 1979. This study is likely to recommend that the maximum economic recovery determination should consider new technology that is likely to be employed in coal mining within the life of the lease. Since changing technology may affect the profitability of the deposit, the tract delineation would be adjusted to recognize this possibility. Analyzing tracts in the light of changing technology will improve conservation of the coal resource, and may also avoid processing later by-pass leases and the administrative costs associated with them. The MER study is also likely to contain an alternative for the Secretary to consider the determination of MER based on individual seam profitability.

4. **Comment.** "I am concerned that the conceptual implementation of statutory fair market value requirements may be too complicated to be workable. The transformation of techniques that inform market decisions into techniques that comprise regulatory mandates often yields unforeseen or undesirable consequences, not the least of which are ever more applications of technical concepts. One example is the limitation on surface owner compensation, which is tied to fair market value determinations. I would prefer to see Federal analysis based on simpler conceptions of protection for the Federal taxpayer, which I believe was the Congressional purpose for the fair market value requirement."

Commenters 147 and 78

Response. The Department recognizes the complicated nature of fair market value determinations and its implications for surface owner compensation. It now has a task force actively working on these complicated issues and expects, with the help of the states, to be able to resolve them in the next two to three months.

5. **Comment.** "Section 3.2.4.3 concerns fair market value and states that it would be established by a discounted cash flow analysis. We feel that the actual methods used to define fair market value should be presented in more detail to allow a basis for evaluation of the methodology to be employed as well as the likely results of its application. Inclusion of an example or test case could allow a better understanding of this concept by the public and industry."

Commenters 106, 098, 096, and 101

Response. The preferred method of establishing fair market value is the use of comparable sales. The discounted cash flow model is described somewhat in a report of the special task force on that subject which is available on request from the Department. It has been the position of the Department that the detailed description of the discounted cash flow model used by the Department is for government use only since it relates quite closely to the evaluation of bids on coal leases.

6. **Comment.** "The State of Utah clearly and unequivocally rejects the notion that the Federal Coal Leasing Amendments Act direct the federal bureaucracy to maximize its monetary return from each individual lease, or to use the coy euphemism employed by the advocates of this institutionalized avarice, 'capture all the economic rent'. It is a contradiction of the spirit of FCLAA, the creation of maximum competition, for the Department of the Interior to pursue the maximization of profits like some nineteenth century Robber Baron. The intent of Congress was to insure that the federal government receive a fair and reasonable return from private use of public resources. The best measure of 'fair market value' is comparable transactions from state and privately-owned coal. Such an estimate based upon available data, will more accurately reflect market conditions — hence 'fair market value' — than federal behavior suitable only to the most brazen attempts at a monopoly market.

"An approach that seeks reasonable returns through a suitable combination of front-end bonus bids and royalty payments will maximize total revenues to the federal government over the long run. Efforts to extract everything the market bears from each individual lease can actually be counterproductive to production. At some level of production royalty or front-end bonus bid would be bidders will shift their capital to non-federal coal if

these are available or even other types of energy resources. The intent of FCLAA was clearly to get development of federal coal resources going – not at any cost, but at fair and reasonable return to the owners of the public lands. An effort to extract maximum return off each lease can be motivated by a bureaucracy defensively misreading Congressional intent, or greedily misreading Congressional intent, or by distorting that intent to frustrate development of federal coal. Whatever the motivation, an insistence that 'fair market return' is a license to pursue monopoly profits will hold down development of federal coal and aggregate returns to the treasury from that development. Those charges for front-end royalty bids will inevitably be passed back to the public in their roles as consumers of power, so it is fiction to pretend that the people experience a net gain from heavy front-end bonus bids or royalties."

Commenter 093

Response. The Department has taken a close and detailed look at the subject of fair market value. Comparable sales data have been and continue to be one of the bases of established fair market value. When the comparable sales cannot be determined, a coal resource economic valuation (CREV) is conducted in an attempt to predict the worth of the coal. The Department does not wish to extort high prices for its coal or to cause consumers high energy prices because of the policy it pursues with regard to acceptable bids on coal leases. At the same time, the Department feels that it must attempt to recover the same amount of compensation for leasing Federal coal as an informed private owner of coal would for his coal. Congress clearly did not intend the Federal government to subsidize the class of consumers that rely on Federal coal. Since more than half the royalty recovered from Federal leases is returned to the states from which it originated, we also feel that good management in acceptance of bids on coal leasing is in the interest of the coal state residents as well.

END-USE CONSIDERATIONS

1. **Comment.** "The DES indicates that the Department is considering an inclusion in the preferred program of a procedure for issuing leases containing stipulations regulating the sale of the coal produced from those leases. We are extremely concerned by such a suggestion as it would reduce the coal lessee to little more than a mining contractor for the federal government and would indicate an intention by the government not only to control the amounts and locations of production, as is implicit in the provisions of the preferred program, but would also imply that the government will undertake to tell consumers from whom they must purchase their fuel. Not only is such a thought violative of the Mining and Minerals Policy Act, which relates to the encouragement of mineral production by the private sector, but its implications go far beyond the confines of a federal coal leasing program and extend into the area of government control of all industries which use coal either as a fuel or in some manufacturing process. Clearly, the authority for and the effects of such a concept have not been discussed in the DES."

Commenter 087

Response. The Department disagrees that the statement fails to discuss the effects of adopting an end-use program. Most importantly, the statement notes that "Controlling end-use would cause very fundamental changes in how the Department leases coal." and that "the consequences of such an increased Federal role would likely be more significant to political and economic relationships in our society than to the environmental values and standards which are within the scope of the statement." Some additional text has been added to clarify the extent of this change, but no fundamental changes have been made in the text. As the comment notes, the Solicitor has not yet determined whether and to what extent authority for this program would exist.

2. **Comment.** "DOI's contemplation of placing end use restrictions on coal mined from federal leases is without authority or justification and has no place in a federal coal management program."

Commenters 083, 092, 078, and 104

Response. The comment does not provide any support for its assertion that an end-use control program is without authority or justification; no specific response is needed in this situation. As a general matter, the discussion of this issue shows that these would appear to be benefits to all concerned if a coal lease was conditioned on certain end-use restrictions. Whether there is justification for a full-scale program is much more arguable. There are

significant costs and risks from involving a government agency in a program of that type. As to the legal authority for the program, the Solicitor's Office has not completed its opinion on the topic. Comments on the Department's legal authority should be sent directly to Solicitor, U.S. Department of the Interior, Washington, DC 20240.

ENVIRONMENTAL DESCRIPTION

1. **Comment.** "Since there is little federal land in Illinois underlain with coal and the leasing of this specific coal will not have a significant impact on the overall development of Illinois' coal resources, The Federal Coal Management Program will not have the importance in the Eastern Interior Region as it does in the West. Nevertheless, the Draft EIS regional projections target Illinois (as part of the Eastern Interior Region) as one of the key areas for future coal production. In light of such a conclusion, we find it disturbing that the federal government's assessment of environmental conditions and impacts is so inadequate, specifically the conclusions the Statement draws concerning reclamation. We also find it disturbing that the Statement is concerned about the regions's ability to recover from mining to uses such as forest and pasture lands, when the majority of the state's land is prime agricultural land. (See page 4–9.)"

Commenter 111

Response. The reclamability text of Section 4.2.1 is based on adequate land management practices and the fact that natural succession is a common ecological phenomenon of the eastern deciduous forest. If, however,the land is not properly managed and erosion or some other long term adverse condition prevails, reclamability may be seriously jeopardized. Forest and pasture lands reclamation is pertinent to the discussion as much of the southern portion of this region is used for these purposes. Prime farm land mining and reclamation would be conducted within the constraint of SMCRA and the unsuitability criteria.

2. **Comment.** "Page 4–17 discusses various Federal lands in Texas. Camp Swift is not mentioned even though a mine is being considered on this property."

Commenter 091

Response. Camp Swift has been added to the FES' list of Federal lands in Texas.

3. **Comment.** "I think the first major point that I would like to say is that you look at the definition of the Powder River Coal Region. It's said to include seven Montana counties and six Wyoming counties. I couldn't even count that many in Wyoming that I could figure out that were the Powder River Basin, as we plunged through it.

"The area then this programmatic speaks to when it always talks about the Powder River Coal Region encompasses somewhere around thirty-one thousand square miles. While this may be the fact in proper technical definition of Powder River Basin, it does not speak to where the majority of coal is centralized and thus to where this impact is centralized."

Commenter 146

Response. The counties involved in each coal region have been tabularized in Appendix H of the FES. The site-specific impact locations are not known at this time, as they would be a function of future tract delineation.

4. **Comment.** "There are several errors in the description of the Powder River Coal Region Environment. On page 4-19 the Powder River rather than the Tongue River should be named as a stream with a heavy sediment load. On page 4-20, prairie chickens are included as birds occurring in this area. However, it is very doubtful that any of this species occurs in the Powder River Coal Region. A reference is made on page 4-21 to a fish species called the shovelnose sturgeon chub. Actually, there is no such species. The authors are probably referring to a shovelnose sturgeon or a sturgeon chub."

Commenter 121

Response. The FES text contains the suggested modifications.

5. **Comment.** "In Chapter 4, Description of Regional Environments, Page 4-20, in Paragraph 4, it is noted that Madison Limestone water reserves exceed 13-million acre-feet. We feel that this figure is extremely conservative and should be revised to more accurately describe the potential of this aquifer. In a statement by Floyd A. Bishop, former Wyoming State Engineer, on the Coal Slurry Pipeline Act of 1975, H.R. 1863, et al, before the committee on Interior and Insular Affairs, House

of Representatives, Nov. 14, 1975, it is noted that there is almost universal agreement that the Madison Formation in this area constitutes a tremendous aquifer, with estimates of total water in storage running from 500-million acre-feet to more than one billion acre-feet."

Commenter 006

Response. Section 4.5.1 has been changed to reflect that the groundwater reserves in the Madison aquifer are uncertain and that estimates range to over one billion acre-feet.

6. **Comment.** "I am pleased to find that Chapter 4, "Description of Regional Environmental Environments" contains several sketchy historical sections entitled "The Environment and Man." Since this is an overall management plan, the omission of numerous historical events, personages, and sites from this section is understandable if unfortunate. Yet, it does not appear that adequate identification and/or evaluation of properties eligible for or enrolled in the National Register of Historic Places was performed for the Powder River Coal Region. The section mentions no sites enrolled in the National Register and Sheridan and Johnson Counties alone contain more that 65 historic sites eligible for or enrolled in the National Register. Section 4.6 'Green River-Hams Fork Coal Region' provides an adequate listing of 50 sites listed on the National Register. However, Danger Cave mentioned on page 4.6.2 is located within Tooele County, Idaho and not in Wyoming."

Commenter 122

Response. The FES contains the suggested modifications. It should be noted that no survey or evaluation of properties eligible for or enrolled in the National Register of Historic Places was performed for this FES because the specific sites involved for any given region are not known at this time.

7. **Comment.**

4–25, and 2nd Column, 1st full paragraph, 2nd sentence:

"Fonelle" should be Fontenelle.

4–26. 2nd column, 1st full paragraph, 2nd sentence:

Should be "Kendall warm springs dace", (not darem). In same sentence the Utah prairie dog occurs in the Uinta-Southwestern Utah Region. It is doubtful if it occurs in the Green River - Hams Fork Region.

4–26, 1st Column:

After 4th full paragraph, insert "The sagebrush biome is a winter concentration area for golden and bald eagles."

4–26.4.6.2: The Environment and Man

1st paragraph, Danger Cave is in Tooele County, Utah (not Wyoming). It is also outside the Green River, Hams Fork Coal region.

4–28, 1st Column, 2nd full paragraph:

"Seedshadee" should be "Seedskadee".

Commenter 266

Response. The FES contains these suggested modifications.

8. **Comment.** "No reference is made in this management program to the Great Divide Basin in the description of the Green River-Hams Fork Coal Region. This formation is a unique geological phenomenon containing several land forms, plant types, animal species and bird species peculiar to that area. The Basin also contains several potential National Natural Landmarks which have been identified by studies done for the National Park Service. However, no mention is made of any of those potential landmarks. This area is richly endowed with paleontological and archeological remains. Surely an area with so many varied cultural resources deserves some type of mention in this study. The Great Divide Basin, per se, is given a cursory mention in conjunction with a casual composite reference to endangered animal and bird species."

Commenter 122

Response. The environmental description contained in Section 4.6.1 applies to the entire Green River-Hams Fork Coal Region, of which the Great Divide Basin is a part. The FES contains a discussion of representative paleontological and archeological resources of the entire region.

9. **Comment.** "Specific corrections to Chapter 4 concern statements on Page 4–21 in the last paragraph in section 4.5.1, the species list for fish should read 'shovelnose sturgeon, sturgeon chub:' in section 4.6.1 on Page 4–26 the last paragraph in the left-hand column should not include rainbow trout and brown trout as *native* game fish (cutthroat trout should be substituted for these two species), walleye pike should be deleted from the list of fish that have been introduced, (the species

does not occur in the Hams Fork-Green River Drainage) under non-game species the word 'rednose' should be changed to 'redsided shiner,' and the word 'shiner' should be deleted; in the first paragraph on the upper right-hand side of this page, 'Farrow's goldeneye' should read 'Barrow's goldeneye'; in the next paragraph, the species is Kendall Warm Spring dace, not daren; the greenback cutthroat is also noted as an endangered species. This subspecies does not exist in the Green River-Hams Fork Region (it occupies the headwaters of the South Platte River); the native subspecies of the cutthroat in this drainage is the Colorado River cutthroat (Salmo clarkii pleuriticus); also on Page 4–26, under section 4.6.2 in the first paragraph in this section, Danger Cave in Tooele County, Wyoming, is an error as there is no Tooele County in Wyoming."

Commenter 006

Response. Agreed. The appropriate changes have been made.

10. **Comment** "(Page 4–30) There is disagreement with the statement in the DES that'... none of the regions are particularly fragile. With proper soil and vegetative management, all can be reclaimed to a near-original state, following surface mining.' What basis exists for this conclusion (e.g., cited evidence of reclamation success on surface mined lands in terms of species diversity, productivity, and ground cover density)? We recommend that this phrase be stricken and that a more qualified statement be included in the FES to reflect the fragility of Western lands (e.g., reclamation difficulties in areas with low precipitation and limited soils, alluvial valley floors, and prime farmlands)."

Commenter 091

Response: This phrase has been amended in. Section 4.71 of the FES contains the suggested alteration.

11. **Comment.** "Additionally, the Utah praire dog does not occur in the Green River-Hams Fork Region. This should be included in the discussion of the Uinta-Southwestern Utah Region."

Commenter 093 and 266

Response. The FES has deleted this species from Green River-Hams Fork Coal Region.

12. **Comment.** "It should initially be observed, however, that as regards the unsuitability criterion of reclaimability, several comments are made for the separate regions which indicate that enough knowledge has already been generated to prove that such reclaimability is usually not a serious problem. See, for example, the comment in the third full paragraph on page 4–30 to the effect that none of the regions are particularly fragile and that with proper soil and vegetative management all can be reclaimed to a near original state following mining. Presumably, the Department will not lose sight of this admitted fact in requiring proof of reclaimability in any region."

Commenters 066, 182, and 187

Response. This statement in the DES has been qualified in the FES, to state that a high degree of reclamation attention would be required in sensitive areas, the Department will continue its awareness of reclamability potential throughout the decision making process of the Federal coal management program.

13. **Comment.** "The statement is made here that "potential evaporation exceeds normal precipitation by a factor of 6 or more' in the San Juan River Region. Certainly this factor has a direct relationship upon the recharge to aquifers used for coal development. Yet no discussion of the total effects of massive dewatering and minimal recharge is contained anywhere in the Draft Environmental Statement."

Commenter 057

Response. Chapter 5 of the FES addresses intraregional water requirements due to coal development. These requirements are considered in light of the water (surface and groundwater) resources of a given region as described in the Water Impacts section text and Appendix E water data.

14. **Comment.** "(Page 4–34) What is the basis for the statement that 'All areas within the region can probably be reclaimed after disturbance, provided that topsoil is replaced as a plant medium and adequate moisture is available for germination and emergence"?

Commenter 091

Response. This statement is based on the ecological principle of secondary ecological succession which is basically defined as the return of an ecosystem to its natural state under appropriate conditions following a catastrophic change.

15. **Comment.** "Para 4.8.2. This paragraph discusses water as a limit on development in the Region. But it fails to mention that by the mid-1980's over 40,000 acre feet of water may be available from the de-watering of deep uranium mines."

Commenters 019 and 135

Response. The purpose of Section 4.8.2. is to describe the existing socio-economic environment of the San Juan River Coal Region in light of the historical role of mankind. For a future analysis of water availability, refer to the water impacts section of Chapter 5.

16. **Comment.** "Page 4–33: The statement is made here that water from the aquifers likely to be drawn upon in coal development are of "poor to fair quality". This is a mistatement, as the Westwater Canyon member of the Morrison Formation which is the aquifer most likely to be used in coal development and contains excellent drinking water used by the Crownpoint area, impacts to this aquifer will affect the only good drinking water available in the San Juan Basin. Substantial impacts such as this should be treated more fully in the final statement."

Commenter 057

Response. Chapter 4 of the FES contains the suggested modification. Ground water effects are addressed in Chapter 5. It should be noted that SMCRA provisions prohibit adverse impacts on ground water quality.

17. **Comment.** "Page 4–33: Although the Surface Mining Control and Reclamation Act mandates reclamation of lands which have been mined, and although the statement here describes the soils of the San Juan River Region as 'shallow, saline and erodable', no substantial discussion of the actual methods for reclaiming this type of soil is made."

Commenter 057

Response. The purpose of Chapter 4 is to describe the environment. Chapter 5 contains a discussion of reclaimability. The method of reclamation would be conducted within the confines of SMCRA. SMCRA enforcement would be conducted by the Office of Surface Mining Reclamation and Enforcement.

18. **Comment.** "Page 4–34: The statement 'all areas may be reclaimed if topsoil can be replaced and adequate moisture is available.' This type of meaningless assertion makes a mockery of the whole process of mitigating environmental impacts. Of course all areas can be reclaimed if those conditions are present. According to statements in this Draft Environmental Statement, the San Juan River Coal Region has fragile topsoil and virtually no precipitation. The possibility that reclamation may not be possible should be discussed as well as the resulting possibility that with no, or minimal, reclamation coal development may well force the migration of all those people living in the area to be developed."

Commenter 057

Response. This statement has been clarified to indicate the area's fragility,

19. **Comment.** "Page 4–34: The San Juan River Coal Region is one of exceedingly complex land status. The discussion here should include a description of these various categories of land which include: Tribal trust land, Tribal fee land, Individual Indian allotments, Executive Order Land (set aside for exclusive Indian use and occupancy), Public Domain Land, Private Land and State Land. Each of these types of land is administered differently and by different individuals and agencies of the Tribal, State and Federal governments. To merely state that most of this land is 'Federal' land is to minimize the difficulties inherent in land use planning in this area. The difficulties are so great that a tri-partite agreement had to be reached between the Navajo Tribe, the Bureau of Land Management and the Bureau of Indian Affairs for the management of the area of proposed coal activity. This agreement and the problems which caused it to be adopted should be included in the final statement."

Commenter 057

Response. Discussions of coal reserves within the above indicated types of lands are contained in Chapter 4 does not contain detailed intraregional discussions of land ownership patterns, because this is site-specific information beyond the scope of the FES. Such information, however, would be germane to any future regional environmental analyses concerning designated tracts, and land for leasing purposes.

20. **Comment.** "Para 4.8.2. The paragraph also fails to mention the work force potentially avail-

able from a 5-county unemployment rate of 12.7% in 1977, as the Star Lake-Bisti Regional ES states."

Commenters 019 and 135

Response. Although this statement is true, Table 4–10 contains pertinent demographic and employment data for the San Juan River Coal Region.

21. **Comment.** "Para 4.8.2. The Draft Programmatic states that regional population is 'relatively' low; recreation is showing 'significant' growth; land ownership is 'primarily' federal; only 'a small percentage' of land is private; in 'many' communities lack of housing is 'extreme.' These are unquantified words, and should be quantified. Similar examples of this lack of quantification can be found throughout this Draft ES."

Commenters 019 and 135

Response. Chapter 4 contains general descriptive data which serve as a foundation for the Chapter 5 impact analyses. For further socio-economic data refer to Appendix E

22. **Comment.** "Para 4.8.2. It is true that the economy of the San Juan River Region is closely tied to energy. But, according to the Star Lake-Bisti Regional EIS, government accounts for the most employment, with 21.2% of regional employment and 24.3% of total income in 1977. This is completely at variance with the data given in Table 4–10."

Commenters 019 and 135

Response. The boundaries and consequently the regional socio-economic data bases differ for the Star Lake-Bisti Regional ES and this FES.

23. **Comment** Chapter 4 - Description of Regional Environments Section 4.9. - Uinta-Southwestern Utah Coal Region. A descripton of the coal resource (types, quantity) should be included. Fishing and hunting, plus other recreation oriented activities, should be included as significant economic characteristics of this region.

Commenter 266

Response. The FES contains these suggested additions.

24. **Comment.** "Page 4–36: The statement at issue here is that water will be a stringent limit on development.' How stringent a limit water will be must be more fully discussed and here we run into the problem of cumulative impacts. Given the massive uranium development planned for the San River Region and the equally massive coal development there is no doubt that water will be an absolute limit on development. Discussion of this limitation is imperative."

Commenter 057

Response. A discussion on regional water requirements is more appropriate to Chapter 5, which contains information and a discussion of water availability.

25. **Comment.** "The twelve coal regions are not sufficiently delineated. A map of each region should be included in the description of regional environments in Chapter 4. For example, the Black Mesa area in Arizona is shown on Figure 1–1 to be a part of the San Juan River Coal Region. However, the textual description of that region does not include any part of Arizona. The Navajo Indian Reservation comprises most of the San Juan Basin, however, the Navajos are mentioned only in a historical sense."

Commenter 088

Response. Rather than 12 separate regional maps, Appendix H (see Table H–6) has been expanded for purposes of detail to include a list of all counties involved in each region. No Arizona counties are included in the official San Juan River Coal Management Region and the text has been modified to so indicate. For information on Indian coal in the San Juan Coal Region, refer to Section 2.7.3.

26 **Comment.** "Hear the end of Section 4.9.1 on page 4–48, the discussion is directed to the reclaimability of lands in general and particularly in the Uinta-Southwestern Utah Coal Region. In stating that the reseeding process may take several years during the drought cycle, the Department is apparently making the unrealistic assumption that mines cannot be expected to have a water supply available for irrigation during the reseeding process. On the contrary, a coal mine simply cannot function without an adequate water supply for many purposes including hydromulching and other reclamation processes."

Commenter 066

Response. Section 4.9.1 has been modified to reflect the mitigatory effects of irrigation on reclamation during drought years.

27. **Comment** "The second paragraph on page 4–38 refers to the deterioration of some watersheds

in this region as a result of overgrazing by domestic livestock and big game animals. Presumably, therefore, the Department will not be so senstitive to relatively small scattered impacts on wildlife habitat as a result of the predominantly underground coal mining which is expected to occur in the Uinta-Southwestern Utah Region. Furthermore, it is hoped that this paragraph does not suggest that coal mining companies will have to bear significantly higher reclamation costs in order to compensate for such overgrazing, much of which occurred not only with the consent but the encouragement of federal land use agencies over the past several decades."

Commenter 066

Response. The intent of this paragraph is to demonstrate that certain ecosystems of the Uinta-Southwestern Utah Coal Region are presently in a state of deterioration. The paragraph does not suggest that coal mining companies will have to bear significantly higher reclamations costs in order to compensate for such overgrazing.

28. **Comment.** "Several corrections need to be made in the description of the Uinta-Southwestern Utah coal region. On page 4–36 it states that 'six billion tons of coal reserves are estimated to be located in this region'. Utah Geological and Mineral Survey reports that within Utah, there are 22.5 billion tons of coal reserves in place. Also, the Bureau of Mines Information Circular 8497, dated 1970, and titled 'Coal Producton from the Uinta Region, Colorado and Utah' states (p. 3) that 41 billion tons of reserve are present in this region."

Commenter 093

Response. The six billion tons figure was obtained from 1977 Bureau of Mines data (see references 2 and 3 Section 2.10 of the DES). It should be noted that Utah's coal reserve base is not restricted to the Uinta-Southwestern Utah Coal Region as portions of Utah are included in the Green River-Hams Fork and the San Juan River Coal Region. As such, the six billion ton figure does not reflect the entire reserve estimate of Utah.

29. **Comment.** "Section 4.9 Uinta-Southwestern Utah Coal Region. A description of the coal resource (types, quantity) should be included and should reflect variability of the resource. Fishing and hunting, plus other recreation-oriented activites, should be included as significant economic characteristics of this region."

Commenter 093

Response. The FES contains the suggested modifications, except for descriptive information on coal resources. Regional coal resource information is contained in Chapter 2.

30. **Comment.** "The tables showing population and economic characteristics for the respective regions (Tables 4–1 through 4–12) list employment in the various sectors in terms of thousands of employees. This appears to be a typographical error which should be corrected.

"It would be helpful if the drafters provided references for the demographic data in this chapter. Perhaps the most useful data in this chapter are the socioeconomic characteristics, especially employment. Yet, without references, reviewers cannot tell how timely or accurate the data is. It is apparent that some of the data, especially coal mining employment, is not current, at least for the Powder River Coal Region."

Commenter 069

Response. Tables 4–1 through 4–12 have been edited to remove the term "in thousands" from the employment columns. The information for these tables was compiled from the Bureau of Land Management, Denver Service Center's Socioeconomic Data Systems.

31. **Comment.** "*Chapter 4.* A more complete description of the coal resources by region should be provided and detailed maps of the extent of each region should be included. Figure 1–1 could be repeated here. Coal is the reason for the document, proposed action, and controversy.

"Page 4–1, section 4.1.1. There is a great unbalance in discussion on the "environment" versus "history." The authors should compare their treatment of sections 4.1.1. and 4.1.2. with section 4.3.1.

"Page 4–19, paragraph 3. How was the figure 130,000 tons per acre derived? 120 feet x 1,770 tons/acre foot = 212,400 tons/acre.

"Page 4–29, column 1, paragraph 4. Clinker is also used to describe burned coal in local mining terminology.

"Page 4–36, section 4.9.1. A description of the region's coal and its quality is needed here."

Commenter 041

Response. Where considered appropriate, the FES contains modifications which reflect these concerns.

IMPACT ASSESSMENT METHODOLOGY

1. **Comment.** "Estimates of coal production from the Powder River Basin Region are considerably too high. The high probability placed on the 'medium' level scenario for the preferred program (Table 5–2, page 5–10 of the DES) is overly optimistic. In planning for projected increases in volume of coal transportation, Burlington Northern conducts a comprehensive research effort to predict future coal traffic from the Powder River Basin. The basis for this planning effort is primarily utility demand as expressed by present and future customers beginning with rate quotation requests by utilities exploring the use of Powder River Basin coal. We also look closely at the plans of the mines we serve and the contracts in effect between mines and their customers. Such analysis convincingly leads to projections more in the range of the 'low' scenarios mentioned in the DES rather than the 'medium' level which is favored in the DES.

"For example, our internal analysis predicts that total Powder River Basin coal production in 1985 will not exceed 175 million tons. This production may be as low as 133 million tons if full-control scrubbing requirements are promulgated by the Environmental Protection Agency. By contrast, the subject DES assumes a total of 205 million tons for the same territory in 1986 (Table 2–5, page 5–10).

"Our projections are further substantiated by the most recent demand forecast (August 1978) issued by the National Electric Reliability Council (attached as Table BN–1). This forecast indicates a *total demand* from *all Western Regions* of 290 million tons in 1985. In view of these forecasts, the "medium" projections used in this subject DES are highly illogical.

"A further illustration of wide discrepancies and over-estimations occur in the supply-demand flows shown in Figures 5–4 and 5–5 (pages 5–107 and 5–108, respectively). These charts depict expected coal flows in 1985 and 1990. Figure 5–4 shows a total of 131 million tons in 1985 from the Powder River Basin. Figure 5–5 indicates production of 329 million tons in 1990. No evidence supports this tremendous 250% spurt in demand in a five year period. The coal volume predictions used in this DES do not appear to give sufficient weight to a number of factors which affect the competitiveness of this region's coal vis-a-vis other fuels as well as coal from other regions in the U.S. There are a number of developments currently in the offing which are now significantly tipping the competitive balance away from Powder River coal as may well reduce drastically even the 'low' scenario."

Commenter 067

Response. Comment a: The levels of production selected are based upon those projected by DOE. The rationale for the levels is to bracket anticipated coal production so that planning decisions can be made. Before selecting regional leasing targets, the Department would consider all evidence brought forward on future levels of production needs, including material such as that offered in this comment.

Comment b: The production estimates incorporated in the Environmental Statement are based upon DOE projections, but are somewhat modified. These modifications reflect the many uncertainties concerning future levels of coal production and energy substitutes, such as imported oil. The estimates of high, medium and low coal production will bracket the realistic range of production possibilities and accordingly, of environmental impacts accompanying such production. While it is possible that the high production level for the Powder River Coal Region is unattainable, inclusion of such a production scenario as the upper end of a range of production levels insures that the Environmental Statement considers *all* potential production levels. Additional National Coal Models incorporating major technical corrections reconfirm the levels of demand used for the EIS.

2. **Comment.** "Tables 5–2 and 5–3 present yet another startling insight into the ES's analysis. Chapter 2 gives the impression that if federal leasing is not undertaken soon production will fall substantially short of the 1990 "needs" - "Achievement of medium and high 1990 production levels would require extensive development of new courses of western coal production ... New federal leasing would make a major contribution in achieving such development." (p. 2–47). This statement is flatly contradicted by the information in Chapter 5, which shows that even with no new

leasing, national production will be sufficient to meet the goals of the preferred alternative medium scenario for 1990! The primary difference between the no new leasing alternative and the preferred alternative for 1990 is that coal production would be more evenly distributed around the nation. 100 million fewer tons would come out of the Powder River region which would be hit incredibly hard under the 'no new leasing' alternative anyway, its production rising from 37 million tons in '76 to 305 million tons in '90. But this would result in no national shortfall even if the 1990 'need' was 1.5 billion tons, which seems impossibly high.

"Having thus failed to demonstrate an actual need for coal leasing, the Department next tries to justify the institution of a leasing program by using other extreneous arguments which have no relationship whatsoever to the amount of coal already under lease. These arguments are that leasing will

1) promote more desirable patterns of coal development;

2) increase competition in the coal industry; and

3) be necessary anyway to process PRLAs.

"These all attempt to establish reasons for leasing, rather than speaking to the need for leasing. There is a big difference between the two, and absent convincing proof of need, these arguments amount to little more than rationalizations and excuses for what Interior really wants to do - lease. Rationalizations, even if they are somewhat persuasive (which these are not), are an inadequate and inappropriate basis on which to make major public policy decisions. The West must not and will not be subjected to the impacts of a federal leasing program on the basis of DOI rationalizations."

Commenter 060

Response: The Secretary will determine the form of the program and the need for leasing based on the analysis presented in this document. The Department believes there are reasons for putting a coal management program in place other than for new leasing purely to meet near-term leasing needs in any particular region. Also, the Secretary does not consider forcing consumers to pay greatly increased energy bills, as would be the case under the no-new-leasing option in 1990, is in the national interest. That is the need for coal should be met under relatively the same level of economic impact on the economy. In addition, while the Department is examining "need" for leasing in response to then Secretary Morton's 1973 order. The Mineral Leasing Act does not require any absolute quantitative showing before a lease can be issued. The program is structured to be sensitive to possible adverse effects from coal development while still meeting energy need.

3. **Comment.** "For example, the Draft ES takes as a given - as an unchallenged assumption of the entire study - that there are no physical, economic, legal, or environmental constraints on the production of coal. Amazingly, the ES assumes that there are no significant multiple use conflicts between coal development and other resources:

"Development of other resources in the Federal coal regions will not significantly interfere with coal development under the Federal coal management program.

"This assumption is obviously fallacious. There are very serious environmental and other constraints on coal development."

Commenter 158

Response. The commenter is incorrect in making the assertion that the Draft ES assumes no physical, economic, legal or environmental constraints on coal production. Production potential from existing leases and from preference right lease applications has been assessed in terms of economic and environmental constraints. They are also the bases for the analyses in Chapter 5.

Concerning the statement that no significant conflicts will occur between multiple resource use, it is implicit that, since this is a programmatic statement, the reference is made on a region-wide basis. Identification of site-specific resource use conflicts must be deferred to individual mine plans and specific lease environmental studies. However, the entire preferred program structure is aimed at identifying and resolving multiple use resource conflicts.

4. **Comment.** "The assumptions used in the analysis (5.1.2) are not realistic. The Department has assumed there will be no delays specifically related to compliance and implementation of current best practicable pollution control technology related to air and water pollutants. The assumption is invalid since the terms used, BPT

and BACT, as used in the statement, have not been adequately defined."

Commenter 069

Response. 1) The assumptions in Section 5.1.2.2 did not address delays related to compliance. Whether or not these delays will be significant cannot yet be assessed.

2) Current best practicable control technology is assumed to be the technology which currently can be applied to minimize air pollution and at the same time meet existing air pollution regulations.

3) Current best available control technology is assumed to be the technology which can be applied by 1985 to minimize water pollution and at the same time meet existing water pollution regulations.

4) The terms such as BATEA (best achievable technology economically available) and BCT (best control technology) are defined in the 1977 Federal Water Pollution Control Act Amendments.

5. **Comment.** "Section 5.1.2 discusses the assumptions made by the Department for analyzing future regional impact of the proposed federal coal leasing program.

"One of these assumptions expects that the production goals established by the Department of Energy will be met. However, in several instances early in the Statement the Department of the Interior indicated that it would not expect to meet these goals by its preferred alternative. Therefore, it would appear that the assumptions determining the environmental impact of the coal leasing program are deliberately based upon the 'worst case' situation. Although typical of environmental analyses, such a situation is not at all appropriate here since the Department has made it clear that the worst case is not preferred and that the preferred alternative will probably be selected with rather insignificant changes if any program is initiated by the Secretary.

"Another one of these assumptions is that no significant delays will be experienced by operating companies in obtaining any and all of the myriad authorizations from federal, state and local agencies. The industry would like nothing more than to be able to believe this, but based upon past experience and the incredibly complex procedures of the proposed federal coal leasing program, it ought to be apparent that such an assumption is unrealistic. Futhermore, it is dangerous because it permits the Department to avoid focusing attention on the many instances in which delays could be decreased by assuming that such delays will not occur or will not create a problem.

"The Department is in general to be commended for the wide range of alternatives discussed in this Chapter based upon innumerable assumptions and recognition of the limitations of quantifying all impacts. This is a basically realistic approach which should tend to support the legal defensibility of the Statement. It must again be noted, however, that far too much attention is paid to developing what are admittedly unrealistic 'worst case' projections for environmental impacts. Although such projections may now have become common to environmental analyses, it is important in any environmental statement and in particular in one of such far-reaching implications as this statement, that the Department repeat emphatically with each presentation of 'worst case' data or environmental impacts that these extremes are very unlikely to occur and are presented only for the sake of bracketing and putting some kind of limit on what would otherwise be a hopelessly vague and unquantifiable anlaysis of environmental impacts. The Department has done this in several cases in Chapter 5. It can only be emphasized that in the final impact statement the Department should avoid any opportunity to give those who would be opposed to renewed federal leasing the ability to quote statements which would appear to insure that the impacts will be incredibly extreme. Such quotes are commonly used in public hearings and discussions with news media in an attempt to scare local officials and local citizens into believing that any coal development in their area will have devastating consequences."

Commenter 066 and 281

Response. The lease to meet DOE production goals was one of the seven major alternatives analyzed in this EIS. Other alternatives assumed higher and lower values for leasing levels. The Department has analyzed a range of cases, not just "worst case". The residuals analyses was based on typical levels of impact. The assumptions commented upon were made in order that the impacts of the Federal coal management program, required to be addressed in this environmental statement, could be analyzed. It would be impossible to perform the required analysis if these assumptions

were not made. If delays occur, they would tend to restrain production below anticipated levels. Thus, the impacts forcasted here would not occur for months or years later than the dates specified in the EIS

6. **Comment** "(Page–22) Table 5–9 should be revised to show which are from Packer and which are from Leathers. Any references to cropland on the table attributed to Packer should be excluded (unless they are footnoted "North Dakota only")."

Commenter 091

Response Packer considers rehabilitation response units in Wyoming, and Montana as well as North Dakota. The data presented in Table 5–9 represent the relative nature of reclamation potential and better estimates of either time to achieve or potential to achieve will be available only when specific sites are considered.

7. **Comment** "(Page 5–10) Series of tables beginning with Table 5–2. Projections labeled low, medium, and high show "high" for Texas to be less than "medium". An explanation of this is not readily apparent.

Commenter 091

Response The high production level presented in Table 5–2 refers principally to production levels in the six western coal producing regions. The explanation for the Texas "high production" being lower than the "medium production" level is quite simple. Under the high production scenario, the level of Powder River Coal Region coal production flowing to Texas is substantially higher than at the medium production level. Accordingly, it is projected that the demand for Texas lignite will be reduced by 15.4 million tons in 1985 under the "no new leasing" alternative.

8. **Comment.** "Given the prognosis of some 1 to 1.1 billion tons per year of coal to be consumed in this country by 1985 and higher amounts in 1990, some estimate of the fly-ash residual should be made. Assuming an ash content between 10–30% of the mined coal, we are talking about disposing of some 100–300 million tons per year. Disposal problems will differ regionally, but on a national level, such a magnitude of often toxic solid waste could pose severe localized groundwater problems. In the Eastern coal regions, greater leaching rates and acidic conditions could result in significant groundwater problems. We have already alluded to the problem this could pose in the Colorado River system. Some discussion of potential mitigation measures to lessen this impact needs to be considered."

Commenter 281

Response. The loading factors associated with solid waste generation from all the phases of the coal fuel cycle are discussed on pages H–45, H–46, H–47, H–48 and H–49. Also the Tables H–37 through H–89 summarize these loading factors on a regional basis.

As for the ash content of coals, Table H–31 presents coal ash content on a regional basis. One of the impacts of solid waste disposal is land requirements. This aspect is discussed in the document (see pages H–45, H–56 through H–108).

As for the toxicity of fly ash and the mitigation measures associated with its disposal, it is our judgement that the Regional Environmental Statements are better suited to address this issue, and the disposal of solid waste will meet applicable local, state, regional, and Federal regulations.

9. **Comment.** "Little or no analysis of noise impacts has been made. EPA could agree that at this level of national analysis, noise impacts cannot be meaningfully evaluated since they are very site-specific. We do expect that the Regional EISs will evaluate noise problems on specific communities and in certain sensitive areas. The Colorado State BLM, for example, has been working with the Region VIII EPA office to define background levels in "quiet" rural areas as well as assessing how various coal developments will affect these levels and more typical urban noise level criteria. This information will be used in the West-Central Colorado Regional Final EIS."

Commenter 281

Response. The commenter is correct in identifying the relatively low value of noise analyses at the national programmatic level. The Department does anticipate that noise impact analysis will be incorporated in the various Regional EISs and treated at length in the site-specific studies preceeding any actual coal production.

In the site-specific studies, in-depth consideration of transportation noise impacts, especially rail and truck, will be expected. Also, potential increases in background noise levels in the "quiet" rural areas noted in the comment will be evaluated

vis-a-vis increased levels of activities throughout the coal development cycle.

10. **Comment.** "C. A further assumption of the ES is that 'Labor, equipment, and capital shortages will not significantly distort the projected levels or timing of the Federal coal management program.' (p. 5–3). In other words, none of these factors will inhibit the doubling of coal production by 1985, which is President Carter's stated goal and one of the goals of the preferred alternative.

"Common sense, the industry, and the General Accounting Office all disagree with this blithe assumption. For example, on June 9, 1977, the *Wall Street Journal* ran a front-page story entitled 'Increasing Use of Coal as President Proposes Faces Myriad Problems; Among Them: Mine Capital, Pollution, Transportation, and Industry's Resistance.' The article began: 'At first, President Carter's plan to increase coal use significantly by 1985 seemed difficult. On closer scrutiny, it looks almost impossible.' Once again, it is typical that everyone recognizes real-world constraints on the demand and supply of coal except the Department."

Commenters 060 and 200

Response. The assumption is made so that the analysis of impacts due solely to the Federal coal management program can be made. The environmental statement is required to analyze these impacts; speculation on the effects of shortages of labor, equipment and capital would delay implementation of the program, but not its impacts. The assumption that these shortages will not arise is at least as reasonable as assumption that they will.

11. **Comment.** "Since coal transportation costs are one of the variables included in the DOE model, it is instructive to see how the model's assumptions correspond to the real situation in the industry. First of all, we see that the mid-range figures are based on 1977 ICC rates escalated at an inflation of 5.5%. One does not need to be an economist to know that our present inflation rates are significantly higher, and that by 1990 the difference between the two could have an appreciable effect on coal movement which, of course, is not reflected in the DOE model as presently iterated. Furthermore, those 1977 rates are, according to the railroad industry, grossly inadequate to finance the capital expansion which they need. In early 1978, for example, Burlington Northern and Southern Pacific applied to the ICC for permission to raise their coal haulage rates 52% on the Wyoming to San Antonio run. They argued that they needed the rate increase to be able to raise capital, but opponents said that such a boost would have a serious effect on efforts to increase coal production because it would wipe out the competitive advantage of coal relative to other fuels. *Wall Street Journal,* May 16, 1978, p. 17. The ES nowhere analyzes this argument, probably because it uses even older rates. The DOE model should be recalibrated accordingly. Of course, even this will not solve the more basic problem that the model and the ES's analysis of need in general have not dealt with the issue of equipment shortages and timing problems of building enough cars, locomotives, and additional lines to increase coal haulage by some 800% by 1990."

Commenter 060

Response. In the example cited above, the Interstate Commerce Commission authorized coal haulage rates to San Antonio approximately 50 percent higher than the rates informally discussed (but not requested) among the railroads and the utility. It is agreed that the DOE model should be modified to more accurately reflect future rail rates. If not, the Department of the Interior would take them into account during regional target setting in the future. However, such an adjustment at this time would be most difficult since there is no established rate structure for the movement of western coal. The establishment of such a rate structure is the subject of an on-going Interstate Commerce Commission investigation entitled Ex Parte No. 274. As part of its analysis, the Commission will address the relationship of rail freight rates on the demand, location, and timing of western coal, development. Changes in factors such as these will, under the preferred program, be taken into consideration in 2–year intervals.

12. **Comment.** "Para. 5.1.2.1. This paragraph should acknowledge that other resource developments (e.g., uranium in northwest New Mexico) will make an increased base load energy demand by 1985 of more than 300 megawatts."

Commenters 019 and 135

Response. Although this fact may be valid, it may or may not have been an assumption used in the impact analysis. The level of demand used in

the DOE energy model does take some account of specific coal users, but relies mostly on statistical forecasting techniques and modeling The FES also assumes that the development of other resources in the Federal coal regions will not significantly interfere with coal development under the Federal coal management program. The FES did not investigate future individual, specific power plant sites. The FES did not investigate

13. **Comment.** " The Statement's assessment of the water impacts of the preferred program is inadequate due to the use of incorrect assumptions in some cases and to the failure to explain assumptions in others. Because the presentation of the Department's analysis of the program is overly general in a number of respects, it is difficult to determine whether the assessment of impacts is complete.

"(1) For example, the estimates of future water consumption are not broken down into uses, making it impossible to compare water usage associated with coal development to water usage for other activities. There is also no description of the assumptions that were used in estimating future water requirements (for example, the annual amount of water used by a standard-size coal gasification plant).

"Some of the data indicate extraordinary assumptions: for example consumptive water use decreases in the Denver-Raton Coal Region between 1976 and 1985, and in the Powder River Coal Region between 1985 and 1990. (Tables E–6 and E–11) Present trends in both of these regions indicate growing water demand. (2) Another inadequacy of the analysis is that estimates of available water in each region are taken from streamflow data of major rivers at the downstream end of each region. (p. 5–57) Using these data as estimates of water availability ignores the problem of water distribution within the region. Examination of this problem in the statement is totally inadequate."

Commenter 089

Response. 1. The estimates presented in Tables E–6 and E–11 were derived from Water Resource Council data. The decreases in consumptions cited for the two regions (2.2 percent and 6.6 percent) are gross projections which must be refined in the regional case sale environmental statements.

2. It is agreed that estimates of available water in each region could be more accurate. However this programmatic environmental impact statement will be followed by regional lease sale environmental impact statements wherein more accurate water availability estimates will be presented. The data presented was deemed adequate enough to satisfy the needs of this statement.

14. **Comment.** "Page 5–7: "In the Coal Impact Estimation Program no mechanism for determining or mitigating impacts to water quantity is included. Since the reduction of water quantity in the aquifers of the San Juan River Region is a certainty given the development planned for the area, this issue should be addressed in any estimation of coal impacts."

Commenter 057

Response. The CIEP is a methodological approach used to quantify and estimate environmental impacts associated with specific program alternatives. Mitigation of such impacts is not a part of the CIEP. Impact mitigation is addressed in Chapter 6 of the draft programmatic environmental statement. In that chapter, mitigation measures are considered on a generic basis. Specific mitigation measures for impacts within a region should properly be addressed in the appropriate *regional* environmental statement.

15. **Comment.** "The principal component of chapter five's environmental assessment is the determination of environmental residuals which result from various coal production levels and patterns identified by the Department in Table 5–2 and Appendix H. These production projections are somehow derived from Department of Energy projections. The process for converting from DOE to DOI projections is entirely conjectural. Appendix H could not explain the basis of the conversion, and Departmental personnel were hard pressed to explain it in public meetings. One of the reasons for the adjustments is well justified—the inaccuracy of the DOE projections as described in these comments, *supra.* However, the adjustments do not reflect what we believe are rational attempts to correct DOE's errors. For example, Powder River production projections are untouched by DOI's adjustments, except for the 1985 High Powder River estimate, which is actually 70 million tons *higher* than DOE's estimate!

"Further comparing Tables 5–2 (DOE projections) and 2–29 (DOE estimates), we find that Interior's estimates for 1985 production *exceed* DOE's forecasts in five regions and throughout the West by 145 million tons, (high level). In 1990, the DOI medium and high estimates each exceed DOE's in three regions and throughout the West by 94 million tons for the high level. When asked about these inconsistencies at the Denver, Colorado DES hearing, Departmental personnel indicated that the Coal Management Office had arbitrarily adjusted some of the projections in order to observe what would happen to the environmental impacts. Based on this explanation, we believe that the projections do *not* actually indicate the regional productions which could be expected under the preferred alternative, or for that matter, any other program. Hence, the environmental loadings which result from application of the Coal Impact Estimation Program (CIEP) to these production projections do not represent the environmental impacts of the preferred program. Prior to analysis of the preferred alternative, the Department must more clearly explain the process for disaggregation and conversion beyond the description provided in H.2.2 to allow a more accurate picture of the actual regional production targets and thus the impacts resulting therefrom."

Commenter 097

Response. The production estimates incorporated in the Environmental Statement are based upon DOE projections, but are somewhat modified. These modifications reflect the many uncertainties concerning future levels of coal production and energy substitutes, such as imported oil. The estimates of high, medium and low coal production will bracket the realistic range of production possibilities and accordingly, of environmental impacts accompanying such production. While it is possible that the high production level for the Powder River Coal Region is unattainable, inclusion of such a production scenario as the upper end of a range of production levels insures that the Environmental Statement considers *all* potential production levels.

16. **Comment.** "Socioeconomic impacts are relegated to insignificance by the environmental residual methodology of the DES. By their very nature, these impacts are local but extreme. The DES prefers to ignore the isolation of extreme impacts to very local populations, preferring to sum population and employment impacts over vast tracts of land which have no relevance to the evaluation of social impacts. For example, the Powder River region includes thirteen countries, but residents indicate that most development has concentrated and can be expected to concentrate in the future on Campbell county. The Denver-Raton Mesa region includes the Denver metropolitan area, yet most of the industry interest is in the Raton Mesa area in relatively underpopulated southern Colorado, certainly outside of the major portion of the 1.9 million population attributed to the coal producing region. In each case, comparing coal related population increases to a 1975 baseline which includes the entire region makes absolutely no analytic sense. Any population impacts should be compared to baseline population in the locally affected communities, individually. A programmatic statement may not be able to evaluate each and every community, but could certainly indicate likely impacts in the more important communities in the affected regions."

Commenter 097

Response. The nature of a programmatic statement necessitates comparisons on a very broad basis particularly when such vast regions are under analysis. It has been stated in the document that such a general approach should serve only as a first step toward identifying potential areas of adverse impact that vary from region to region. While this has been accomplished by the analysis, it is agreed that individual communities within any one of the regions may be more severely affected. However, analysis of such local impacts are beyond the scope of the programmatic statement and can only be identified in the more site specific analyses that must be initiated as development occurs. The regional lease sale EIS under the preferred program would be mainly aimed at analyzing such problems.

17. **Comment.** "The heavy environmental considerations; primarily sociologic, included in the proposed federal leasing program promote and urge the development of underground coal mining versus surface mining because of less apparent environmental impacts."

Commenter 073

Response. We disagree. The sociologic changes associated with underground mining may

be greater than those associated with surface mining because of the greater number of people needed to produce a given amount of coal from an underground mine vs. a surface mine.

18. **Comment.** "Another equally erroneous assumption is stated openly on page 5–3, 'Development of other resources in the Federal coal regions will not significantly interfere with coal development under the Federal coal management program.'

"The Minerals Division of the Department of Economic Planning and Development (DEPAD) of Wyoming recently published a report on industrial activity which indicated Uranium employment will outstrip coal employment by 1983. (7394 to 6733 workers). In 1977, 2969 people worked in the Uranium industry in Wyoming, and produced 9 million pounds of yellowcake. In 1983, 7394 workers are expected to bring 25 million pounds to market. Interior must understand that Wyoming, (and to a large extent Campbell County), holds approximately 35% of the nation's Uranium reserves.

"The pressures to develop this resource are intense, and in many senses, unrestricted. There is no leasing program for Uranium. Since a good deal of Uranium activity will take place in Campbell and Converse Counties, Interior has an obligation to detail the impacts of that development, and how, in fact, it *will* interfere with Federal coal leasing.

"NOTE: In 1978, 11 Uranium mines and one mill were in operation in Converse County. In the period 1979–1985, 25 new mines and a new mill are expected in Converse County. In addition, 6 new Uranium mines and 2 mills are expected in Campbell County, and 4 mines are anticipated in Johnson County. (Mineral Development Monitoring System, DEPAD)."

Commenter 118

Response. The assumptions listed in Section 5.1.2.1 were made in order for the analysis to proceed. With regard to the assumption cited, the impacts of uranium development may be important but the quantification of those impacts is beyond the scope of this environmental statement. The summary of impacts for the Powder River Coal Region in Section 5.2.5 emphasizes the concern expressed in the comment. Conflicts between uranium and coal production would be addressed in Federal land use planning EISs. Generally, they are not expected to cause significant dislocations.

19. **Comment.** "Table 5–12. 1990 figures are the same for the San Juan River Region and for the Uinta-Southwest Utah Region. One or the other is wrong."

Commenters 019 and 135

Response. The data in Table 5–12 of the DES are being checked to eliminate typographical errors and incorporate new data on water consumption in western coal regions.

20. **Comment.** "5–8.2: You should note that in the Uinta-Southwestern Utah Coal Region nesting areas for golden eagles and winter roosting concentration areas for bald eagles would be potentially affected."

Commenter 266

Response. The suggested language has been added to the FES.

21. **Comment.** "5–8.1: Green River-Hams Fork Coal Region: The endangered fishes mentioned are not supported by "the cold, clear waters of the Green River system." These endemic Colorado Basin fishes require the turbid, relatively warm waters of the lower elevations. The conversion of warm turbid waters to clear, cold waters by construction of reservoirs that trap sediment and lower summer temperatures is one of the main reasons for the decline of these species."

Commenters 266 and 093

Response. Concur; humpback chub and Colorado squawfish removed from section. Sentence changed to read "The waters of the Green River ...". Kendal Warm Spring Dace remains based on the inclusion of Kendal Warm Spring in our region as mapped.

22. **Comment.** In Section 5.2.3.3, pages 5–81, the "...cold clear waters of the Green River...." in the Green River-Hams Fork Region are described as supporting the endangered hampback chub, Colorado squawfish and Kendall warmsprings dace. This is totally untrue. The humpback chub and squawfish are restricted to lower quality, turbid waters of the Colorado River System and the dace to Kendall Warm Springs in Wyoming.

Commenter 266

Response. "Cold clear" has been removed from the sentence since Green River includes both

higher altitude "cold" water feeder streams and rivers typical of lower attitude. "Colorado squawfish" and "humpback chub" references have been removed from Green River-Hams Fork Region discussion. However, based on our region as mapped Kendall Warm Springs does fall into the Green River-Hams Fork, Coal Region.

23. **Comment.** "Water quantity and water quality relationships in the different coal regions should be better identified. In particular, activities in the Colorado River Basin need to focus closely on salinity problems, using data from recognized sources such as the Colorado River Basin Salinity Forum to predict cumulative water quality impacts. The Department will need to closely assess the potentially serious problem of trace metal contamination developing from mining operations in a number of coal producing regions."

Commenter 281

Response. The comment requests that mining activity and salinity problems in the Colorado River Basin be addressed in the draft EIS.

1) Recognizing the seriousness of the problem in the Colorado River Basin a paragraph was incorporated on page 5–44 to point out the issue at this stage. The paragraph reads as follows:

"To minimize the deleterious impacts on the Colorado River of saline drainage waters resulting from operation of mines and coal-using facilities, these facilities should operate in accordance with the policy, adopted by the seven-state Colorado River Basin Salinity Control Forum and the states of the Colorado River Basin, of no-salt returns in industrial discharges, wherever practicable. This policy has been followed by the states and the Environmental Protection Agency in the issuance of National Pollution Discharge Elimination System permits in the Colorado River Basin. Adherence to this policy will minimize the salinity deterioration below Hoover Dam."

2) It is true that trace metal contamination resulting from mining operations poses a serious problem to the environment, however it is not the intent of this programmatic Environmental Statement to go into such details. Regional Environmental Statements may be better suited to address this issue. This issue is discussed qualitatively in the final EIS.

24. **Comment.** "The potential impact of subsidence on water availability in springs and seeps, water and mesic micro-habitat sources extremely important to wildlife, is not adequately addressed in Section 5.2.2.6, pages 5–26.

Commenter 266

Response. Any area adjoining an excavation is normally subjected to increased stress as a consequence of the redistribution of load. This may be at the front of, or at the sides or rear of, a working face. Changes, diversions, or pollution of surface or underground water may occur, and pits and cracks may result due to these stresses, resulting in increase of soil moisture in same areas. A change in soil moisture may lead to a change in plant cover which would result in a change in wildlife habitats. These changes are highly site specific and could be beneficial or detrimental to wildlife."

25. **Comment.** "Under the discussion of geologic impacts from coal extraction, the EIS categorizes impacts on archaeologic resources as site-specific. While this is ultimately the case, we wonder whether the proposed BLM-USGS assessment mechanism could not at least identify regional locations where there is a high probability of certain strata containing archaeological fossil remains. Those strata likely to be affected by coal mining enterprises need to be identified early in the process. Eventually limited areas of such strata might be included under unsuitability criteria, if the potential resource is valuable enough."

Commenter 281

Response. While it is true that certain regions are presently known to have a higher probability for containing archaeological remains, this knowledge is more often the result of the intensity of investigations in the particular region rather than a definitive knowledge that the region has more sites (or a greater probability of sites) than another region. Unfortunately, the present level of archaeological knowledge of the various regions does not allow any particular region to be singled out as having a low probability for sites and thus would be a better location for mining than a region with a high probability. The leasehold specific or county specific survey is still a definite requirement.

26. **Comment.** "Page 5–24, Section 5.2.2.3. Surface mining is not the only phase with geological impacts. Subsidence and reclamation resulting from underground operations should also be discussed here."

Commenter 041

Response. Geological impacts (subsidence) due to underground mining are discussed in Section 5.3.2.3. Reclamation is discussed in Sec. 5.3.2.6.

27. **Comment.** "page 5–25, Section 5.2.2.4. No discussion of depletion should omit the quantity of coal in the United States and the fact that this coal could last on the order of 250 or 500 years."

Commenter 041

Response. Section 5.3.2.4 and Section 7.2 discuss the amounts of coal that would be depleted in the years 1985 and 1990, and Table 2–1 presents demonstrated reserves in the U.S. How long these reserves will last depends on many variables such as technology, future energy sources, health effects, policy, etc.

28. **Comment.** "Page 5–102, table 5–60. What is the royalty rate used in calculation? Were the current Federal royalty rates of 8 percent and 12 1/2 percent used? Was the royalty rate applied to the present price of coal or the expected price in 1985 and 1990?"

Commenter 041

Response. Yes, the Federal Royalty rates of 8 and 12 1/2 percent were used to compute projected royalties shown in Table 5–60 for the years 1985 and 1990. Also these rates were applied to an assumed coal price of $20 per ton in 1978 dollars.

29. **Comment.** "Page 5–128, Table 5–70. Why is the standard of 1,750 tons/acre foot, which is used only for calculating lignite reserves, applied to surface disturbance of coal lands with higher rank coals? Mining of higher rank coals will disturb fewer acres."

Commenter 091

Response. 1750 tons of coal per acre foot is the widely accepted number for calculating tonnage from seam thickness. On a weighted average basis, this number is representative of most coals. This same number was also used in U.S. Energy, Research and Development Administration, 1977. Draft Environmental Impact Statement — Coal Research, Development and Demonstration Program, Washington, D.C.

30. **Comment.** "Page 5–154, note (a) at bottom. A matter that affects "almost all of Utah land" and favors leasing there should warrant appropriate treatment elsewhere in the EIS.

Commenter 091

Response. The unsuitablility criteria as tested represented a draft version of the criteria. Results of the unsuitability criteria field test should be considered as representative of the effect of applying the draft criteria to potential lease areas. Subsequent versions of the criteria will, in all probability, result in substantial revisions to estimate of the land areas affected. Accordingly, the data presented in Table 5–73 should be viewed as preliminary, although representative, data. Additional data will be available by May, 1979, for on-going applications of the revised criteria in selected planning areas.

31. **Comment.** . "(Page 5–94) With regard to the DES's discussion of impacts on agriculture, the DES should include a discussion of the alluvial valley floor protection provisions of SMCRA in addition to the prime farmland provisions."

Commenter 091

Response. Section 5.3.4.3 is being revised to reflect the provisions of SMCRA vis-a-vis alluvial valley floor protection.

32. **Comment.** "Archaeological Analysis. Under the discussion of geologic impacts from coal extraction, the EIS categorizes impacts on archaeologic resources as site-specific. While this is ultimately the case, we wonder whether the proposed BLM-USGS assessment mechanism could not at least identify regional locations where there is a high probability of certain strata containing archeological fossil remains. Those strata likely to be affected by coal mining enterprises need to be identified early in the process. Eventually limited areas of such strata might even be included under unsuitability criteria, if the potential resource is valuable enough.

Commenter 281

Response. While it is true that certain regions are presently known to have a higher probability for containing archaeological remains, this knowledge is more often the result of the intensity of investigations in the particular region. Unfortunately, the present level of archaeological knowledge of the various regions does not allow any particular region to be singled out as having a low probabilitly for sites and thus would be a better location for mining than a region with a high probability. The leasehold-specific or county-specific survey is still a definite requirement.

RECLAMATION

1. **Comment.** "Section 5.3.1. discusses land disturbance and reclamation in general terms. Although this section is helpful in finally putting into proper perspective the relatively small amount of disturbance which will be experienced in western coal regions relative to the rest of the country, it does contain some distortions and inconsistencies which should be corrected in the final impact statement."

Commenters 057, 058, 061, 089, 097, 105, 107, 111, 118, 123, 130, 148, 154, 160, 172, 173, 174, 176, 187, 188, and 281

Response. Land disturbance and reclamation are discussed in Section 5.3.2.1. This section is being expanded in the final ES and inconsistencies in the DES will be rectified.

2. **Comment.** "On page 5–22, a table entitled "Time Required to Reclaim Mined Land" in the West, states, by area, that very precise amounts of time are needed to reclaim to rangeland. For example, it says it takes 9.6 years in the Power River area and 14.1 years in the San Juan area. Where has this been demonstrated? No areas are given as proof because there aren't any. At best, reclaimability in the West is an open question. This is half heartedly acknowledged on p. 5–23 by the statement that, 'The question of whether or not initially irrigated plant communities on reclaimed areas could maintain native area densities for an indefinite period of time has not been answered.' Yet all the tables of impact comparisons assume reclamation can and will occur."

Commenters 057, 066, 091, 093, 154, 163, 167, 171, and 266

Response. Table 5–24 has been changed to read *estimated* time required to reclaim mined-land. Estimate of years required to reclaim have been rounded up to remove the implied precision while retaining the relative importance. The emphasis should be on the fact that as a whole, reclamation in the San Juan River Coal Region is believed to take longer than in the Powder River Coal Region. The actual time required for reclamation is highly dependent upon site specific information which cannot be determined until actual sites are chosen.

No doubt each of the regions have areas which will take longer or shorter periods of time to reclaim (depending on the goal of reclamation) and some areas that if disturbed cannot be reclaimed at all. The unsuitability process would screen out these latter areas.

3. **Comment.** "On page 5–17, at the bottom of the first column, reference is made to estimates of land which would normally not be reclaimed. Curiously, this estimate considers land occupied by buildings and coal conversion and processing plants as lands most likely not to be reclaimed. It should be noted that these lands are fully bonded for reclamation and, in the sense that the salvage of the buildings might pay for the reclamation itself, have as good or better chance of being reclaimed by the appropriate state authority or contractors working with that authority, if necessary, than any other areas. Furthermore, concentrating on such areas as unreclaimable indicated that the Department would expect a larger proportion of surface directly disturbed by underground coal mining to be unreclaimed relative to that expected to be unreclaimed as a result of surface mining. There is no basis for such an assumption particularly since on the same page under 'Reclamation Potential,' the flat statement is made that all mined land will be reclaimed. It would seem that this statement is directly contrary to the assumptions which are basis for the estimates in Table 5–8."

Commenter 066

Response. Estimates of land disturbed and reclaimed have been revised. However the revision numbers still reflect the probability that land committed to hard surfaces, (buildings, etc.) would remain unreclaimed longer than land used for mining coal. Some of the confusion might be caused by the fact that the FES includes building caused by the presence of mining in the area, but not located directly at the mine site.

4. **Comment.** "Also, this statement does not fairly assess the impacts new Federal coal leasing would create. Socio-economic and air quality impacts are too narrowly defined, but perhaps most disturbing is the section on reclamation. The assumption that prime farmland in the Northern Great Plains can be easily reclaimed after mining to equal or better production is not well documented, and contradicts substantial data to the contrary. In NPRC's seven years of work on the effects of coal development, we have rarely seen such a rosy prediction of reclaimability. The State

of Montana, which has the most stringent reclamation law in the nation, has yet to give its stamp of approval to a single acre of reclaimed land able to support argicultural production."

Commenters 172 and 185

Response. No assumption was made that prime farmland in the Northern Great Plains could be easily reclaimed after mining to equal or better production. To reclaim any area to a given use will take a lot of effort and will require detailed consideration of site-specific characteristics, and careful step by step planning. Prime farmland will not be leased unless it has been demonstrated that it can be reclaimed.

5. **Comment.** "The statement assumes that prime farmland will be reclaimed in five to fifteen years without providing a documentation of this assumption. The statement fails in some areas to distinguish between acreage mined and acreage disturbed, which is very inconsistent and leads to false conclusions. The statement also fails to assess the impacts of burning all that coal."

Commenters 185 and 172

Response. The reclamation potential of five to 15 years for prime farmland is based on personal communication with S.D. Zellmer (Agronomist, Argonne National Laboratory) and L. Ross (Department of Soil Conservation, Iowa). In addition, Packer, (1974) suggested that in higher response units (areas with best combination of factors influencing successful reclamation) reclamation to agricultural cropland may occur in one to five years.

Acres disturbed have been recalculated based on land allocated to mining and land allocated to other uses (coal banning and conversion). These will give a better basis for comparisons of the effects of coal extraction and those of coal conversion.

6. **Comment.** "The statement does not consider the long-term effects of unsuccessful or partially successful reclamation efforts. By limiting its scope to the period before 1990, the statement ignores the cumulative effects of long-term mining on Federal coal land. Dependence upon coal during the 1980's will create pressure to continue mining that resource in the future. A comprehensive environmental statement must consider the cumulative effects of unsuccessful reclamation efforts, or at least consider the possible effects of continual coal mining activities over a time period that is sufficiently long to ensure steady-state conditions *(i.e.,* the amount of land being successfully reclaimed equals the amount of land being disrupted). Because the statement assumes *a priori* that all reclamation will be successful, neither of these alternatives is considered.

Commenter 089

Response. Section 5.3.2 has been upgraded to respond to these concerns. Under the preferred program, the Department would not lease unreclaimable lands.

7. **Comment.** "Para. 5.2.3.2. This paragraph discusses post-mining habitat losses, but does not address habitat gains which are likely with successful reclamation. Again, a subtle hint that impacts will be greater than they actually will be."

Commenters 019 and 135

Response. The impact assessment of habitat losses is based on a 1985 and 1990 time frame. Reclamation during this time period would be in its initial phases. In the long run, reclamation would most certainly be contributing to wildlife habitat gains.

8. **Comment.** "The League believes that the use of land should be related to its inherent characteristics and carrying capacities; therefore, we recommend that *reclaimability* of mined land be assigned a high priority in *land-use planning* and that lands that cannot be returned to their previous productivity be immediately screeened out of consideration for leasing."

Commenter 171

Response. The Surface Mining Control and Reclamation Act of 1977 establishes strict standards of reclaimability for any coal lands to be mined. Consistent with this Congressional mandate, the Department includes *reclaimability* in its unsuitability criteria. As indicated in the draft statement, each criterion is applied in the initial phases of the land use planning process to eliminate lands from further consideration for leasing. It should be noted that SMCRA requires lands to be returned to their former use, not former level of productivity.

A final test for reclaimability will be applied before approval of the mining and reclamation plan.

9. **Comment.** "5–23, 1st Column, 5th paragraph: The Uinta-Southwestern Utah Region has areas equally as adverse to Reclamation efforts as those mentioned."

Commenter 266

Response. Concur. The referenced section has been expanded in the FES to better reflect reclamation potential.

10. **Comment.** "(Page 5–17) With regard to the discussion of reclamation potential, we offer the following comments.

a. Packer (1974) estimated reclamation potential on a scale of +9 to -9 (not +8 to -8). In addition, he addressed only the Northern Great Plains States of Montana, Wyoming, North Dakota, and South Dakota (not Colorado, Utah, Arizona and New Mexico). Therefore, the DES should not imply that his findings hold for the entire West.

b. Packer (1974) believes that the higher rated response units, which occur predominantly in North Dakota, can be rehabilitated successfully in one year to agricultural cropland and in five years to mixed grass range. In medium-rated response units found in moisture areas of southeast Montana and northeast Wyoming successful rehabilitation should be achieved in five to ten years, depending on whether land is to be returned to short-grass, grassshrub steppe, or a mixture of these and ponderosa pine. On the lower-rated response units in the drier portions of northeastern Wyoming and northeastern Montana, from five to fifteen years may be required to successfully return the land to short-grass and/or shrub steppe which was present prior to mining. It should be noted that restoration to cropland is mentioned only for North Dakota, not for the other two States (much less for the entire West). The time required for reclamation increases as areas become drier. One can therefore project that time to achieve reclamation in Arizona and New Mexico will be much in excess of those quoted for the Northern Great Plains.

c. Cook, et al. (Revegetation Guidelines for Surface Mined Areas, No. 16, December 1974) states that arid areas underlain by strippable coal have precipitation rates of six to nine inches, together with excessively high evaporation rates. For these reasons, Cook, et al., report that natural revegetation is unpredictable and may occur only every five to seven years in most desert areas, when favorable conditions provide for germination, emergence, and establishment.

d. Although North Dakota mines are identified as having the highest reclamation potential, Packer (1974) does point out that there are serious problems associated with highly saline (sodic) overburden. Although this problem might presumably be dealt with by covering highly sodic spoils with topsoil, Power, Ries, and Sandoval (Reclamation of Coal-Mined Land in the Northern Great Plains, Journal of Soil and Water Conservation, March-April 1978, (pp. 69–74) pointed out that sodium in North Dakota mine spoils tends to migrate upward into soil material spread on the surface. The seriousness of this sodium migration problem has only been researched in recent years, and final answers as to how it can best be handled are not yet available.

e. Power, et al. (1978) conclude that the technology does not exist to economically restore the mixed native prairie of the Northern Great Plains in less than 30 to 40 years; however, Power, et al., indicate that introduced vegetative species can be established. Reclamation procedures required by Western States seem adequate for initial restoration of plant growth potentials, but long-term stability of the landscape and perennial vegetation is unknown.

f. Barth (Reclamation Practices in the Northern Great Plains Coal Province, Mining Congress Journal, 1977, Vol. 63, No. 5, pp. 60–64) studies revegetation success on seven mines in the Powder River and Fort Union Regions. He found that although a wide variety of species were planted, few of these species were found in revegetated areas. Species that failed to establish themselves were generally native grasses.

"In summary, with respect to the potential for revegetation in the West, there are reclamation management problems relating to salinity and aridity which are still unresolved by those charged with reclamation of Western coal mined lands. In addition, the long-term prospects of existing revegetated areas (only a few years old in most cases) are still in doubt. The DES should be revised to reflect this conclusion."

Commenter 091

Response.

The text has been changed to reflect Packer's scale of +9 to -9.

There are many remaining problems with successful reclamation as indicated by this thoughtful comment and the volume of current research. Each site potentially mined would require detailed information on existing conditions prior to any mining to give a data base for reclamation planning. Conditions would be expected to vary between sites and in different sections of a site. Each potential problem area could require a unique approach if reclamation is to be successful. Realistic land use goals are a must throughout the premining, mining, and reclamation planning process.

11. **Comment.** "(Page 5–82) Chapter 5 should somewhere address the availability of the mining equipment necessary to achieve the production estimates."

Commenter 091

Response.

The commenter is correct in identifying the need for additional mining equipment and the necessary lead times required as a potential obstacle to the attainment of production goals. It is true that a leasing program (whatever its form) will influence the demand for mining and related coal extraction equipment. The programmatic shows that the effect of differing levels of Federal leasing would largely be to shift the capital available for coal operations to different regions of the country. However, the programmatic nature of this environmental statement precludes estimation of specific equipment requirements. The appropriate forum to address this issue is in the regional environmental statements, where precise information about anticipated production facilities can be utilized by industry to generate precise estimates of equipment needs.

ENVIRONMENTAL ANALYSIS

1. **Comment.** "As is the case with the strip-mining or deep-mining of coal, the environmental impacts—the degradation of air quality, disruption of hydrologic systems, and the disturbance of agricultural land and wildlife habitat—are likely to be site-specific, rather than generalized. The Draft Environmental Statement should reflect this fact, rather than aggregating impacts and giving the appearance that they will occur generally over a broad geographic region."

Commenters 123 and 160

Response. The FES, as well as the DES, is restricted to generalized impact analyses due to its programmatic nature. Site-specific impacts cannot be analyzed at this time because the specific tracts involved have not been delineated. Tract delineation and site-specific environmental analyses would be the subject of future regional and site-specific environmental assessments if a program is adopted which necessitates leasing.

2. **Comment.** "The cumulative impacts of letting new leases and of their subsequent development must be evaluated. Likewise, the cumulative impacts of mining old leases should also be evaluated. Previous plans have understated or ignored this problem."

Commenter 176

Response. The precise cumulative impacts of all lease management actions will be the subject of future intraregional environmental statements subsequent to any tract delineation identification. This statement estimates what they might be based on generalized relationships between mining activities and impacts.

3. **Comment.** "The primary, and I think most serious problem with the Draft Environmental Statement, is that it totally ignores the issue of cumulative impacts which I know face the San Juan River Coal Region and which I presume may be present in other coal areas as well. As you should be well aware, no development takes place in a vacuum. When an area faces extensive coal development on the one hand and extensive uranium development on the other, as the San Juan River does, any discussion of the impacts of one type of development is virtually useless without a thorough consideration of the other type. Treatment of topics such as water impacts, socio-economic impacts or air quality impacts are fatally flawed without analysis of the cumulative impacts of all development planned for one area. I will discuss further the need for investigating and addressing cumulative impacts in the specific comments I will make later."

Commenter 057

Response. Non-coal related developments are not addressed in the FES because their impacts would occur regardless of any decision on a Federal coal management program. While a regional study of all future development scenarios might be useful, the coal program review and

analysis is not the proper instrument for such a study.

4. **Comment.** "There are other potential problems resulting from the adoption of either the preferred program or some of the other alternatives discussed in the DES, which also should be analyzed. The management of Federal coal resources is important to the overall national energy picture. Therefore, the results of any program adopted should be considered with respect to their effect on the domestic economy, the national defense, U.S. foreign policy, and the value of the dollar as well as on various economies around the world. If the effect of the coal program adopted by the government is inflationary or appears to place more importance on values such as esthetics, recreation or wildlife protection than on energy production, consideration should be given to the perception of other nations with respect to the resolve of the United States to carry out the objectives of the President's energy program."

Commenter 087

Response. The preferred program is primarily a domestic concern to the United States since it is essentially a means of reducing reliance on foreign energy. The macroeconomic effects of any programmatic option which increases the domestic coal production would have a positive effect on the domestic economy, national defense, U.S. foreign policy, and the value of the dollar. The precise effect, however, is speculative and subject to change. Though the affects of coal on the future of the world's economy and environment might prove significant, it is necessary to put some outer bounds on the scope of key analysis. The Secretary has decided that a regulatory analysis is not needed for the entire preferred program, but has requested enhanced economic analysis of unsuitability criteria and of the maximum economic recovery definition after notices.

5. **Comment.** "We also feel that the DES fails to provide an analysis of the effect of the semi-nationalization of the coal industry which would effectively be the result of the preferred program and its system of leasing in response to government determinations of supply and demand."

Commenter 087

Response. The DES, as well as the FES, does analyze the effects of the preferred program and its alternatives. The Department, however, does not consider the Federal Coal Management Program to be equivalent to the "semi-nationalization of the coal industry." Rather, the program is intended to regulate coal development, which ultimately must be conducted by coal industries, in an environmentally sound manner consistent with national needs and the public interests.

6. **Comment.** "If the estimates of 0.2 to 2 percent coal dust loss from unit trains on p. 5–53 are based on the Weigert and Jensen report they should be researched again as these estimates are not based on research. More than one source of information should be used. These emissions do not accurately reflect emissions from *dry* western coals. The relationship between power plant emissions and coal leasing policy, if there is one, is unclear. Additionally, the impacts of gaseous emissions are not defined anywhere, nor are gaseous emissions from mines or power plants related to air quality standards. Probability of violation of standards should be addressed as well. Finally, there is no discussion of impacts from nitrogen oxide fumigations due to overburden and coal blasting."

Commenter 071

Response. Weigart and Jansen was not used as a source. In *Railway Age,* "Crusting Agent Minimized Loss of Coal in Transit," September 9, 1974, it was reported that a 70-ton coal car may lose up to 1.5 tons of coal in a trip from West Virginia to northern Indiana.

7. **Comment.** "Trace elements have impacts other than those associated with health (e.g. to livestock, crops, wildlife and vegetation) which should be discussed. How do trace element impacts, on coal dust, power plant emissions, and overburden vary from region to region and thus, how do they relate to the leasing policy?"

Commenter 071

Response. Trace elements that are harmful to man and his environment are found in coal. Concentrations of these elements may increase during production and consumption in various waste streams; for example, in the coal feed ash, water effluent, coal refuse, and stack gas. It is beyond the scope of this statement to estimate trace element impacts on a programmatic basis. This analysis is more appropriatly performed in the regional coal lease sale environmental statement.

8. **Comment.** "Why are emission control standards for power plants addressed, and emission control for coal mines and coal transport not addressed? Certainly the latter would be of greater importance in defining a leasing policy. If not, why not? "The analysis of nonattainment areas is irrelevant. Where are the nonattainment areas, and how do they relate to coal mining and to coal leasing policies? Will emissions controls at coal mines be sufficient within the various regions to prevent allowable PSD increments from being violated?"

Commenter 071

Response. Relating gaseous emissions to air quality standards requires the application of diffusion models to translate emissions in the form of quantities of pollutants per unit of time (e.g., tons per year, pounds per day) into concentrations of pollutants expressed as micrograms per cubic meter. Such models require site-specific data such as local climatological characteristics, terrain features, and the size and operational conditions of the pollutant source. Because of this site-specific data requirement, a programmatic statement can only discuss such factors as air quality (i.e., pollutant emissions) and nonattainment areas generically. Air quality impacts and the relationship between a particular action and any nonattainment areas are detailed for specific actions in such documents as the environmental statements issued for each mining and reclamation plan. Emission control standards were presented for power plants because such performance standards exist; however, standards have not been promulgated for coal mining or coal transport except that a particular type of equipment may be included in a particular source performance category.

9. **Comment.** "There is no analysis of the variable geographic impacts which would occur as a result of the leasing program summarized in the EIS."

Commenter 197

Response. Chapter 5 (Section 5.2) has been revised so that the FES contains a region-by-region impact analysis summary.

10. **Comment.** "In Chapter 5 of the DEIS, there is not sufficient discussion of the impacts of a Federal coal leasing program, such as the no leasing alternative, which would result in the increase of the development of non-Federal coal sources. The impacts from increased non-Federal coal development should be discussed in the FEIS."

Commenter 090

Response. Impacts due to non-Federal coal development are incorporated in the no new leasing alternative.

11. **Comment.** "There is little discussion of the broad impacts of a decision to delay leasing. What could be accomplished if the time were available to assess the impact of the Coal Leasing Act Amendments, the National Energy Plan, the New Source Performance Standards, the newest oil price increases, conservation which is taking place simply as a result of energy price increases, and so forth? What are the national human consequences of an oversupply of Western coal? As Mr. Laue pointed out, what are the national human environmental consequences of an undersupply of Western coal? The fact that it would be an undersupply answers no questions."

Commenter 195

Response. Impacts due to non-Federal coal development are incorporated in the no new leasing alternative. Analyses must be conducted on the basis of the situation as it exists at that time; the preferred program, which would include the possibility of no new leasing and would provide for periodic reassessments of the impact of coal leasing on the nation in light of changing situations.

12. **Comment.** "The environmental analysis sections suffer from fatal flaws:

1. It is written in gibberish. It is dominated by incomprehensible phrases such as "environmental residuals," and sentences such as "Due to the dynamic nature of coal transportation, incorporation of the transportation sector in the analysis required a methodological approach which recognizes the inherent differences between static processes and dynamic flows (p. 5–5)." These examples were selected at random. It is disorganized and pieces of analysis appear in several places. This style of writing occurs when authors do not understand their subjects. As a result, the EIS does not inform; it serves only to confuse the reader. On this count alone, it should be redrafted."

Commenters 154, 069, and 281

Response. The environmental analysis sections in Chapter 5 have been substantially revised for purposes of clarity.

13. **Comment.** "Define the jargon 'environmental residuals' (p. 5-1)."

Commenter 071

Response. The term "residuals" proved to be confusing and so the term has been deleted from this statement.

14. **Comment.** "How is your coal cycle cyclic (p. 5-1)? b. Will money be generated from this "cycle" to support alternative, especially solar, energy developments?"

Commenter 071

Response. a. The coal development cycle is cyclic in the sense that the statement considers impacts associated with all activities from coal extraction through utilization. b. Money generated from coal development cycle operations that accrues to the Federal government under the Federal coal management program becomes part of the general funds that are used to support Federal programs.

15. **Comment.** "The Department of Energy's coal demand projections should be revised to take into account 1) the current slump in the coal market; 2) the glut of Alaskan oil which may be crossing Montana via the Northern Tier Pipeline; and 3) the potential influx of Mexican natural gas."

Commenter 071

Response. As noted in Section 5.3.1.2 of the draft programmatic Environmental Impact Statement, many believe that the national coal model projection under the 1985 medium level demand of 1.1 billion tons (a 64% increase over 1976 production) is overly optimistic, particularly in view of the myriad of uncertainties involved in estimating coal demand, including, such as the factors mentioned in the comment. Nevertheless, it is felt that use of high, medium, and low production projections derived from the NCM output effectively bracket the range of regional coal demand in 1985 and in 1990.

16. **Comment.** "What other goals for reclamation are implied by the statement that "the major thrust would be to return disturbed land to the contour and use specified..."?"

Commenter 071

Response. No goals were implied since these may be highly variable depending on individual mining and reclamation plans. The assumption used was that reclamation technology will not change significantly by 1990 and the major thrust would be to return disturbed land to the contour and use specified in the approved reclamation plan.

17. **Comment.** "How would shortages in the transportation network affect your assumption that development of other resources would not interfere with coal development. How have transportation costs been built into your assumptions on where to develop."

Commenter 071

Response. As explained in Section 5.1 and H.2 of the environmental impact statement, coal production and consumption levels were derived in part from the Department of Energy's National Coal Model (NCM). The NCM uses a least economic cost methodology first to estimate the level of regional coal production and second to allocate this production using the most economic transport route. The medium and high production estimates reflect 1977 Interstate Commerce Commission rates, escalated at an assumed inflation rate of 5.5 percent. The low estimates assume a one percent escalation.

18. **Comment.** "What is the meaning of the last sentence in the last assumption concerning compensating regional production adjustments?"

Commenter 071

Response. "Compensating regional adjustments" means that production shortfalls will be made up in other coal regions.

19. **Comment.** "Have reclamation costs been used to determine leasing policy?"

Commenter 071

Response. Reclamation costs are an element of the proposed alternative leasing policies to the extent they influence the ability of mine land to be reclaimed. Relatively low reclamation costs (in terms of both monetary and ecological values) would indicate a greater production success in reclaiming mine land. The converse would also be true.

20. **Comment.** "Basing reclamation potential on Packer's work is very riskly, particularly in view of the time required for soil and plant community

development in a semiarid region such as the Powder River Basin (p. 5-17)."

Commenter 071

Response. Section 5.3.2.1 has been expanded to better explain the intent of Packer's work, and to include other research as well. Actual reclamation potential in any of the regions can only be determined after detailed site-specific information has been obtained. The intent at this programmatic level of alternative analysis is to show general trends that could be expect on a regional level. Individual leases, and areas within a leased tract, may vary considerably from the regional characteristics.

21. **Comment.** "Page 5-23 (6th paragraph) How is it possible to determine whether initially irrigated plant communities on reclaimed areas could maintain native area densities for *indefinite* period of time? Sounds like research Hodder might be interested in."

Commenter 071

Response. The sentence has been changed to read, "The question of whether or not initially irrigated plant communities can achieve and maintain densities similiar to undisturbed native areas has not been answered."

22. **Comment.** "What are the potential air quality impacts?"

Commenter 071

Response. Air quality is measured in terms of concentrations of a given air pollutant per unit volume, such as grams per cubic centimeter. Since this environmental impact statement is not site-specific, it is impossible to estimate impacts, or air quality, other than in terms of emission rates. Thus, the use of the words "potential air quality impacts" is meant to imply that the measures are not only projections of what could occur, but the more precise method of measuring air quality cannot be used.

23. **Comment.** "Impacts of particulates are inadequately defined and addressed. The only impact defined is the reduction in visibility, but no context is given. How large is the surrounding area (p. 5-51)?"

Commenter 071

Response. Table 5–42 presents estimates of impacts on visibility as a function of particulate concentrations. It is impossible to calculate concentrations without site-specific data such as climate, winds, terrain features, emitter characteristics, etc.

24. **Comment.** "In conclusion, it would seem that information has been presented here in a random fashion without definition of impacts, or their magnitude and significance. Are we to conclude mining, particularly strip mining, has no impact on air quality? The data are obviously available; consequently, this section must be rewritten and the original authors sent back to their respective divisions, and replaced by qualified, competent professionals."

Commenter 071

Response. The kinds of detailed studies referred to will be presented in the regional coal lease sale environmental impact statements.

25. **Comment.** "Is the loss of potential productivity here based on acreage disturbed, on reclamation potential, or on postreclamation productivity projections? The impacts vary significantly depending on the definition (p. 5–73). Productivity losses are based on misleading data. It should be pointed out that belowground and aboveground productivity is listed in the tables."

Commenter 071

Response. Potential productivity loss is based on total commitment of land (assuming no reclamation) times an unweighted productivity average (excluding agriculture). As indicated in the text it is useful for comparisons between alternative leasing policies and should not be interpreted as actual losses. These can only be derived when actual sites are known and data specific to those sites is available. In Appendix D, potential productivity values were derived from allotment of acreages to various land use categories times estimates of potential productivity. Again these are expected to vary considerably once actual sites are known.

26. **Comment.** "What, in either the Powder River or Fort Union coal regions, could be defined as a nonsensitive ecosystem? In light of the climatic conditions, and the disastrous results of dryland farming in the 1930's (and the subsequent dustbowl conditions), it is insane to call any of this area 'nonsensitive' (p. 5–75)."

Commenter 071

Response. Concur. The sentence has been deleted. What was implied was that coal development was assumed to occur in common types of vacant land areas and not in known sensitive (e.g., nest areas of raptors) or limited ecosystems.

27. **Comment.** "In your discussion of impacts to endangered species of the Powder River coal region: where do grizzlies and wolves occur? Neither animal is mentioned in chapter 4. Is all the information presented herein as accurate as this (p. 5–81)?"

Commenter 071

Response. Neither the grizzly nor wolf are known residents of the Powder River Coal Region at present. They were residents in recent past and were included more on historical range than actual presence.

28. **Comment.** "Through the admission of the DES, 82% of the coal to be produced in the Powder River Basin will come from Wyoming. The figures below emphasize the point further, in that 88% of Wyoming's Powder River Basin Coal lies in one County; Campbell.

"This gross oversimplication renders meaningless the discussion of actual impacts in the Wyoming Powder River Basin. The DES discussed air quality impacts over an area of 31,300 square miles, when, as we have shown, an overwhelming percentage of activity and pollution will result in Campbell County, Wyoming, with an area of 4,800 square miles. The same holds true for population impacts, when the base used is 228,000 people while Campbell County, in the same year, had only 17,000 people. The treatment of impacts to wildlife agriculture, water and many other components of the environment is equally as useless, due to such a large base used for comparison."

Commenter 118

Response. While it is true that Campbell County does contain the vast majority of the Powder River Coal Region reserves, the programmatic nature of this environmental statement precludes the analysis of potential impacts at less than regional levels. It is the role of the regional and site-specific environmental studies to assess the cumulative effects of coal resource development at the county and community level.

29. **Comment.** "In the third full paragraph on page 5–53, the implication is left that Western coal uniformly has more radioactive material in it than Eastern coal. We know of no authorities to support this implication, and would suggest that the Department clarify this to indicate that since both Eastern and Western coals vary widely in quality and trace element content, such a statement concerning radioactivity cannot be applied across the board to all Western coal."

Commenter 066

Response. This paragraph has been revised to dispel this implication.

30. **Comment.** "Although the draft ES for the preferred program mentions their existence four times and supplies a table of air pollution emission factors for 22 of them, trace elements are basically ignored. Their effect on the environment, however, may be as large as any other effect, and may well be more devasting in the long run."

Commenter 097 and 281

Response. It is true that the effect of trace elements on the environment may be serious; however, it is not the intent of this programmatic environmental statement to go into details which require characterization of local coals. Regional Environmental Statements would be better suited to address this issue. The discussion of trace elements in the FES has been reviewed and amplified as appropriate.

31. **Comment.** "Page 5–50. Any discussion of air quality impacts in the San Juan River Region must include the effect of the cumulative impacts of uranium mining and milling."

Commenter 057

Response. Emissions of air pollutants in the San Juan River Coal Region for the 1976 base case include those due to uranium mining and milling. Emissions of air pollutants for 1985 and 1990 are projected only for the Federal coal management program alternatives. To project emissions for other potential industrial activities in 1985 and 1990 is beyond the scope of this statement.

32. **Comment.** "The total suspended particulate has been underestimated, when we use the Pedco (sic) figures at two pounds per ton produced. That's an average figure, but it's been taken from most of the Western mines. I get around an average of twenty percent of the total impact was assessed in this statement.

Commenters 146 and 118

Response. The greatest variability in estimating total suspended particulates from mining would come from the fugitive dust portion of the TSP loading. The amounts of fugitive dust vary with the type of mining, the coal regions, and even within coal regions. Because of this, the loading used in the DES may be low for one region (or part of a region) and high for another region. It should be noted that the fugitive dust loadings and the resultant TSP loadings may vary as much as 25-fold per unit of coal produced depending on site-specific characteristics.

33. **Comment.** "The Statement's discussion of air quality impacts of the preferred program is insufficient. Because the Department assesses air quality impacts within the coal production regions only, the full end use impacts of the program on national air quality are not considered. Since much of the coal will be burned outside the coal production regions, the Department's region by region comparison of total emissions does not provide, as alleged,

A comparison of the emissions associated with the Federal coal management program alternatives against the no new leasing base case. (p. 5–50) We also question the Statement's proposal that a comparison of the total emissions for each alternative is the most meaningful measure of relative air quality impact available. (5–50)"

Commenters 089 and 281

Response Coal production (mine construction, extraction, cleaning, plant construction, and equipment operation) and coal consumption (facilities construction and use in coal – fired power plants, and coal conversion facilities) are the major sources of air pollutants attributable to the Federal coal management program. Tables 5–18 and 5–19 present coal production and coal consumption estimates for 1985 and 1990. These tables show that over 98 percent of the coal produced in the United States is forecast to be produced in the 12 coal regions examined in this statement, and over 75 percent of the coal is forecast to be consummed in the 12 coal regions. It is agreed, therefore, that impacts on national air quality are not considered. However, the method employed of comparing emissions associated with the Federal coal management program alternatives with the no new leasing base case is considered to yield an accurate relative estimate of how national air quality would be impacted due to the Federal coal management program.

34. **Comment.** "Since the impact of a specified level of emissions in some regions would exceed the impact of the same level of emissions in others, the proposal is not necessarily correct. For example, the impact of a strip mine or a coal-fired electric generating plant is more likely to have a noticeable impact on air quality within an air basin in the Northern Great Plains or Four Corners Region than would a mine or plant of the same capacity if it were located in the Eastern Interior or Western Interior Region, because of the differences in ambient air quality of these regions."

Commenters 089 and 281

Response. The comment is well-taken. This is the reason why it is impossible to determine the impacts on air quality due to activities performed under the Federal coal management program without being site-specific. The rationale for this limitation is discussed in Section 5.3.2.7.

35. **Comment.** "The estimates of total land disturbance are subject to challenge. In addition, this method of calculating plant and wildlife loss neglects the fact that certain habitat zones support wildlife from a much larger area. For example, bottomlands cover only four percent of the land surface in the Northern Great Plains, but they provide water and winter forage for wildlife that range over a much larger area. Habitat characteristics vary within each coal region and in some cases the wildlife within different habitats are interdependent, so the loss of one type of habitat could upset the balance in another."

Commenters 089 and 281

Response.

Estimates of land disturbance have been recalculated to include land requirements for coal-related population increases. In addition, estimates of the various land-requiring activities have been separated into those which require land on a yearly basis (e.g., mining) and those which represent total land required by a specific point in time (e.g., land for fixed facilities).

The points on habitat and wildlife interdependence are quite true. However, to give a meaningful analysis of specific effects on a given population or habitat would require site-specific information. At this programmatic level of analysis it had to be assumed that each alternative had an equal

potential for effecting any habitat or population within a region. To analyize each habitat and each population within each region would provide interesting data, but would not give a means of comparing alternatives unless it can be shown that an alternative favors a specific habitat over another.

Loss of habitat in one area and its effects on adjacent area population are covered in the general discussion on Ecological impacts (Section 5.3.3).

36. **Comment.** "The statement also fails to deal adequately with the ecological impact of increased human population and easier access to previously undisturbed areas in the coal regions. The increased population resulting from coal development would exacerbate impacts due to hunting, fishing, off-road vehicles use, and other human outdoor activities. New roads and rights-of-way for pipelines, transmission lines, and aqueducts could open remote areas by providing a pathway for penetration into the areas, possibly disrupting fragile environments and faunal migration patterns. The most significant effect of increased human activity may be that it could drive certain species out of large areas, reducing their habitat by a much larger area than is represented by the estimates given in the statement."

Commenters 089 and 281

Response.

In the revised estimate of land disturbance, a component has been added to include land requirements for coal related population increases.

Impacts from human activity are included in the general discussion of Ecological impacts (see Section 5.2.3 DES)

37. **Comment.** "It is stated that degradation of local air quality would occur even though best available emission control technologies are employed (p. 7-2). Why is this chapter assuming best available technology for impact evaluation when in chapter 5 best practicable technology is assumed?"

Commenter 021

Response. Section 5.3.2.7 assumes best available emission control technologies.

38. **Comment.** "In the second paragraph of page 5-24, the incredible statement is made that the primary surface disturbance associated with underground mining is a lowering of the surface in the area mined (subsidence) to depths which vary from a few feet to 'hundreds of feet.' We believe it would come as a great surprise to anyone in the industry to be made aware of areas in which underground mining has resulted in subsidence of hundreds of feet. Even considering the very thick, shallow deposits in the Powder River Basin which often exceed 100 feet and assuming that somehow that coal might be mined by underground mining techniques not yet developed, it still defies the imagination to determine how such mining would lower the original elevation by hundreds of feet. Such seemingly innocuous statements made in such an offhand manner are just the kind of statements which will be taken out of context by groups opposed to any new coal operations in the West to try to scare those who might otherwise support new leasing into believing that the consequences of that leasing could be devastating. Furthermore, the very next paragraph of the Statement recognizes swell factors and discusses typical lowerings which indicate that the Department, although using swell factors which are lower than those usually experienced, recognizes that the effects of subsidence in changing surface elevations are really not that serious."

Commenter 066

Response. It should be noted that the paragraph referred to is a description of the potential impacts to topography of *surface* mining, not underground mining. Underground mining is only mentioned in the first sentence and then only to indicate the considerable variation between the effects of surface and underground mining. For a discussion of the topographic effects of underground mining the commenter is directed to the section 5.3.2.2.

39. **Comment.** "b. *The statement's evaluation of the extent to which the preferred program will result in land disturbance is inaccurate.* In estimating land disturbance, the statement claims to use a figure that includes land committed to mining and conversion, although an adequate description of the derivation of this figure is not given. (pp. 5-17 and H-26) Estimation of other quantities of land was considered beyond the scope of the document due to site-specific factors. (p. 5-17) Since '(p)rospective environmental impacts of economic development and population growth stimulated by

the conversion of energy from strippable coal in the West are likely to far exceed the impact of surface mining alone,'[28] some estimate of the amounts of land which would be disturbed by roads, pipelines, and residential and commercial structures should be made. It is possible to identify a range of estimates within which the probable amount of land needed for these developments would occur, given a specific level of coal-related development. One could then bracket a subset of the range of estimates for each region based on factors such as estimated population increase, average amount of land required for a residence, and a ratio of commercial to residential acreage."

Commenter 089

Response. Land disturbed due to secondary impacts such as roads, pipelines, and powerline construction was included in the analysis. (See Appendix H.)

40. **Comment.** "The next one is topographical features would be altered by construction and mining activity. Go out here anyplace where they are subdividing and people are moving in to this state, in small amounts, really, there is always some ground changes. Those changes are not bad."

Commenter 139

Response. The FES presents the topographical changes in view of physical changes to the environment. Judgemental assessments such as whether these changes are good or bad are beyond the scope of the FES.

41 **Comment.** "The subsidence of land could result from underground mining activities. Well, since when hasn't land subsided? Every time it rains out here we get something dropping in somewhere. If you want to talk about subsidence, you had better take a look at the environment itself, nature itself is producing subsidence. There are thousands, if not tens of thousands, of holes in the east part of the State of New Mexico, many of them right on the highway, many of them underneath railroad tracks, have dropped out underneath highways and are really a severe danger just from solution and natural collapse on the part of nature. The amount of subsidence that would take place, if you ever did get to underground mining, would be very negligible. I think this thing could just be left out of this."

Commenter 139

Response. It is true that subsidence triggered by rainfall and other natural occurrences causes regional topography to be in a constant state of dynamic change. In most cases, subsidence due to underground mining would be comparatively negligible, but in certain cases it is major. The FES addresses underground mining subsidence because it is a relevant environmental impact.

42. **Comment.** "Para. 5.2.2.3. This paragraph states that 'surface mining operations would produce significantly greater geologic impacts than underground mining.' However, USGS Open File Report 78–473 states that in the Western Powder River Basin, underground mining is more geologically damaging if proper surface mining reclamation procedures are followed. This Draft Programmatic should be consistent with other Department of Interior documents."

Commenters 019 and 135

Response. The above-cited USGS statement is not considered applicable since it is referring to very long-term post-reclamation geological features. During the time frame of this FES, active mining will be on-going and on this basis the statement of the FES is considered valid.

43. **Comment.** "c. The Statement provides misleading assessment of the preferred program's impact upon topology and soils."

Commenter 089

Response. A description of the exact level of impacts to topography and soils that could occur due to mining activity requires detailed data from each site being mined. As stated in the DES, the amount of such changes would be highly dependent on the characteristics of a particular site. In a programmatic impact statement, the specific sites of coal extraction operations are not known and impacts can only be described on a general basis. Such detailed, site-specific impacts would be included in the impact statements issued in connection with each mining and reclamation plan.

44. **Comment.** "On page 5–25 at the top of the second column the statement is made that in-

[28] National Academy of Sciences, *op. cit.*, p. 107."

creased mining might result in uncontrolled fossil collection. This statement, although really of minor environmental impact, is rather farfetched in that surface mine properties, for a variety of reasons, including the liability of the mine operator for the safety of the surrounding populace, are simply not left open for anyone to run across the property gathering fossils or otherwise having free access to pit areas and other disturbed lands."

Commenter 066

Response. This statement was aimed at the possible impacts associated with conjunctive development and not actual surface mining. It is recognized that such mining activities would limit access to the areas by stringent controls. However, other surface-disturbance activities outside of the lease tract could expose fossiliferous rocks (e.g., cuts for access roads or rail lines). The statement has been revised to indicate its application to conjunctive development activities.

45. **Comment.** "The first two full paragraphs on page 5–26 discuss briefly potential conflicts between oil and gas development and coal mining. Unfortunately, it would seem to be the attitude of the Department that such potential conflicts will often be resolved by requiring that one resource be developed to the exclusion of the other. Such a decision will rarely prove necessary. In the northern Appalachian Coal Region, there have been hundreds of thousands of wells drilled over the past 100 years, yet that region has been and remains one of the prime coal producing areas in the country. Of course, it cannot be said that such dual development has never resulted in actual conflicts concerning recovery of one mineral or the other. However, the Department of Energy and the Bureau of Mines have developed techniques for mining through abandoned wells even in underground coal mines and there are many alternatives which can accommodate both methods of resource extraction without excluding one or the other in the same tract. This conflict is particularly important in the West, where many of the prime oil and gas producing areas in existence and that can be expected to be discovered will be in areas with important Federal coal reserves. Any program which sets up an 'all-or-nothing' battle between oil and gas interests can only result ultimately in losses of these critical resources to both industries and the Nation as a whole."

Commenter 066

Response. One purpose of the environmental impact statement preparation process is to present all the issues. Resource conflicts may not have been as serious in the past as they may be in the future as we strive to become more energy dependent. As set out in Chapter 3, the Department emphasizes planning to eliminate potential resource conflicts under the preferred coal managering program.

46. **Comment.** "Specifically, we request the following be added somewhere in Section 5.2.2.6, 'Water Impacts', beginning on page 5–26 of the report: 'To minimize the deleterious impacts on the Colorado River of saline drainage waters resulting from operation of mines and coal-using facilities, these facilities should operate in accordance with the policy, adopted by the seven-state Colorado River Basin Salinity Control Forum and the states of the Colorado River Basin, of no-salt returns in industrial discharges, wherever practicable. This policy has been followed by the states and the Environmental Protection Agency in the issuance of National Pollution Discharge Elimination System permits in the Colorado River Basin. Adherence to this policy will minimize the salinity deterioration below Hoover Dam."

Commenter 113

Response. The above paragraph was incorporated in section 5.3.2.6.

47. **Comment.** "Also, a serious study should be made into the effects of mining coal as an aquifer. Many ranchers in the Powder River Basin of Wyoming rely on the coal seam for stock water, and the mining of this resource will destroy a reliable water supply, in terms of both quantity and quality.

"According to our calculations, between 182–217 acre-feet of water are removed with every million tons of coal (25–30% of Powder River coal being water). By 1990, at 400 million tons per year mined from the Basin, a possible 86,800 acre-feet of water will be literally shipped out of the region. What are the long term effects of this practice?"

Commenter 118

Response. Groundwater is available in Powder River coal mines both from shallow and deep aquifers. For some cases, coal seams are associated with or located above groundwater aquifer systems. In order to mine this coal, it may

be necessary to dewater it (locally). This water can be used as process water and for other uses at the mine site.

Generally, mining of coal may cause change, diversion, or pollution of surface and underground water. However, appropriate mitigation based on Federal, state and local requirements should minimize these problems. These effects would be analyzed in the regional lease sale EISs under the preferred program.

48. **Comment.** "We are very concerned about the off-hand treatment of water consumption impacts due to renewed Federal coal leasing. The DES indicated that water deficiencies at the 95% low-flow levels should be expected in the Basin. It went on to say that increased coal production would not cause additional deficits in months not presently experiencing shortages, but would exacerbate the existing problems.

"As Interior should know, the water is most required in the West when there is none to be had.

"The worst months, in late summer, are very critical to agriculture in this state. While numbers may not reveal an apparent increased impact, it is obvious to any farmer that coal production will worsen a drought year, and possibly make that consumptive difference which spells disaster."

Commenters 118 and 146

Response. The textual statements in the DES regarding water shortages appear to be accurate and to reflect the projections shown in the Tables. Numbers do indeed reveal an apparent increased impact by showing for specific alternatives that the demands will be higher than under the base case. It is difficult to see how the DES could have been more explicit in pointing out that with or without the coal program, there may be water shortages in the West and that such shortages will be worsened under alternatives that increase consumptive use. It is also true that in the summary of regional impacts in Section 5.3 considerable emphasis is placed on the issue of water availability in the West.

49. **Comment.** "Tables 5–10, 5–11 and 5–12 show higher water requirements in the Fort Union Region for the low leasing level than for the medium level. This should be reviewed and explained if the figures are correct."

Commenter 204

Response. The apparent discrepancy is attributable to the overall level of development of coal production end use facilities presently envisioned in the medium and low production scenario for 1985. Slightly higher development rates of coal-using facilities are anticipated under the low production scenario, while under the medium production scenario a greater proportion of Ft. Union coal would be transported out of the region.

50. **Comment.** "The programmatic EIS should recognize that the focus of air-quality impact issues for Federal coal production will lie *with the potential conflict between coal mining/processing operations and environmentally sensitive air quality areas.* Specifically, EPA is concerned about the leasing of coal in proximity to Class I air quality areas defined under Prevention of Significant Deterioration Regulations. Under these regulations, most of the emissions from coal producing/processing facilities can be adequately controlled with the notable exception of fugitive dust, a major problem in many Western coal producing areas. Visibility reductions over Class I areas are a genuine concern with new leasing. Problems of this kind have already surfaced at the Alton, Utah coal field. In our discussions on Unsuitability Criteria we suggest a possible way of identifying these kinds of air quality impacts *prior to leasing.*

"Other specific comments are enumerated below and are keyed to page numbers.

"Page 5–53. The section which discusses emission control standards quotes EPA-proposed standards for power plants. It is difficult to understand the connection between power plant regulations and standards which would pertain to "production facilities using fossil-fuel steam generators."

"Page 5–56. The reason for the inclusion of Table 5–29 is unclear. The text (page 5–53) mentions only SO_x and TSP, yet Table 5–29 also lists NO_x. Furthermore, comparison of state emission regulations is a very complex subject. We believe that the table is factually incorrect, e.g., New Mexico's TSP regulation, Arizona's and Ohio's SO_x regulations are *not* more stringent than the proposed power plant NSPS; and the Pennsylvania SO_x regulation does not apply to all areas of the state. References 78 through 83 appear to have been omitted or are misplaced.

"Page 5–57. The purpose of Table 5–30 is obscure. While this material is factually correct, it is not used to develop any point.

"Pages 5–62 through 5–71. We believe that material of this type would be best if summarized (perhaps national totals) in the document with the detailed results placed in an appendix. It would be helpful to have totals on Tables 5–39 through 5–43.

"We are not sure how the Tables 5–34 through 5–43 were generated for nationwide emissions from all coal-related sources for the different alternative coal leasing programs. In particular, we find it difficult to see how there could be variations in SO_2emissions (powerplant-related) as shown in Table 5–35, given the assumption that the nationwide new source performance standards for SO_2emissions would be met as stated under Section 3.1.2. Yet on page 6–1 the statement says that the impact analysis in the previous chapter does not include those mitigating measures required by law of regulations. The EIS should make clear the extent to which controls have or have not been placed on impact parameter estimates.

"Since projections of end-use (basically powerplant combustion from the NCM model) define the level of expected impacts for various time frames and scenarios, the EIS should also make clear the number of actual new powerplants projected. The estimate of megawatt size should also be identified, particularly where industry projections are available."

Commenter 281

Response.

a. The emission control standards discussed address fossil fuel steam generators regulations. These generators have heat input of 250 million BTUs/hour or more. Whether these generators are for steam only or associated with electric power production, the emission standards are the same.

b. The reason for the inclusion of Table 5–45 is discussed in Section 5.3.2.7. The Table does not compare state regulations with proposed NSPS but it compares state regulations with existing NSPS. The references have been included. Also some changes are made to the Table to reflect some of your comments.

c. The Clean Air Act and the National Air Quality Standards were discussed in Section 5.3.2.7. Thus it was judged appropriate to show these standards in a separate table.

d. The referenced tables compare regions and alternatives, considered to be important and necessary presentations in this analysis.

e. A correction was made to read "The impact analysis in the previous chapter *does* include those mitigating measures required by law or regulation".

f. An estimation of the number of electric power plant facilities can be derived from the tables in Appendix F using an average of 1,000 MWe plant size consuming an average of 2.6 million tons of coal a year. Applying these assumptions to the Appendix F data (specifically, steam generation consumptive use), approximately 196 power plants were in existance. The number of plants would increase under the preferred program medium-level projections to 345 and 486 in 1985 and 1990, respectively.

51. **Comment.** "On page 5–41 is a discussion of the projected consumptive water requirements in the Upper Colorado River Basin. This discussion concludes with an observation which is made for other regions to the effect that the Water Resources Council figures relied upon in the Statement, are probably exaggerated by a "double count" which includes general use, plus coal development. The Statement should present more reasonable water consumption statistics based on efforts to eliminate this double count. Failure to do so, even with the express recognition that the double count may exist, again gives critics of the coal leasing program and of western coal development in general the opportunity to capitalize on a very sensitive subject in the West by using exaggerated figures for water consumption to imply that municipalities and agricultural activity will be severely deprived of water if additional coal leasing occurs. Even though the Department tries to put the exaggerated water consumption into perspective by describing it also as a percentage of low-flow total water availability, it is felt that additional efforts are necessary to prevent this very sensitive subject from being misunderstood."

Commenter 066, 089 and 097

Response. There is no feasible way now to relate specifically the assumptions which underlie the WRC data to the conditions postulated for any of the programmatic alternatives analyzed. The problem of double counting has been addressed and its effects largely removed in the tables of

water flow and in the revised text in Section 5.3.2.6. In the revisions, it is assumed that where the WRC requirements for a given watershed (or combination of river basins) in 1985 exceed estimates forecast by the analysts preparing this environmental impact statement for the no new leasing alternative, then the coal-related water usage is assumed to be reflected in the WRC figures. This approach can be supported by the fact that both the WRC projections and those of the above analysts (under the no new leasing alternative at the medium level of coal production) assume that 1.1 billion tons of coal will be mined in 1985. This point is established in a memorandum from the Bureau of Mines. There are four watersheds for which energy-related water requirements exceed those for all purposes as estimated by WRC. For these, the requirements are considered as *additional* to those of WRC and the residual flows shown in the tables are accordingly reduced (as in the draft EIS). Here the problem of double counting cannot be eliminated and the point is emphasized. The fact that the projections for these watersheds represent a "worst case" or upper bound on water consumption which is expected to exceed conditions that will actually exist. It happens that even with the double counting only one of these watersheds is projected to show a deficit; that is the Missouri-Kansas watershed where the deficit is for a single month and exists even without the double counting.

While the above approach mitigates the problem of double counting (by eliminating it in 60 percent of the watersheds), no totally satisfactory method is known at this time to relate the impacts of coal-related requirements to total water consumption. The point is made in the text that none of the alternatives differ significantly and that none will change a seasonal shortage into a surplus or conversely create a deficit.

52. **Comment.** "EPA considered this impact to be one of genuine national/regional concern. Water limitations could definitely put constraints on the proposed coal program. Unfortunately, the water resources/water quality portions of the Draft EIS on the Federal Coal Management Program are weak, poorly organized, and it is difficult to make any meaningful sense out of the information. It is not at all clear what specific water uses are included in the various alternatives. Therefore, it seems to be impossible to directly compare figures in the draft with estimated water uses from other sources. As a specific example, we have attached water use estimates prepared by the Salinity Forum as Appendix A. These projections are about as good as any available; however, it does not seem possible to make a direct comparison between the Forum's projections and the figures in the draft EIS.

Commenter 281

Response. The water quality and water supply sections of this environmental statement have been reorganized in response to this and other commentors. This restructuring should allow comparability of the EPA and DOI water use estimates.

53. **Comment.** "Table 5–5 and following four tables imply a shifting of coal production to western coalfields under all but the 'no new leasing' alternative. Lacking here is an analysis and discussion of the competitive position of Western coal versus Eastern coal, particularly in view of new requirements for emission control devices on all powerplants, rising transportation costs, and increasing demands on limited water supplies in the West. Potential impacts of a western shift in coal production on employment and regional economic stability in Eastern coal producing districts should be briefly discussed."

Commenter 079

Response. Section 5.3 of the FES addresses the points raised.

54. **Comment.** ."5.2.2 Physical Impacts and 5.2.2.6 Water Impacts "As a result of the lack of specificity in the draft statement, it is difficult — if not impossible — to evaluate this section. The terms are very general in nature, and it is difficult to assess whether the tables are adequate or meaningful.

"— Table 5–44, page 5–74, 'Comparison of Potential Primary Productivity Loss.' This table needs clarification and references. In addition, Tables 5–42, 'Nitrogen Oxide Emissions,' and 5–43, 'Hydrocarbon Emission,' are difficult to interpret. A statement should outline the criteria on which the emission factors were generated and what kind of emissions would impact what areas.

"— Table 5–46, 'Potential Threats to Endangered Species of Coal Regions,' is extremely misleading. The column labeled 'Most Serious

Threat' to the endangered species is purely conjectural unless better referenced. It appears the most serious threat specifically related to strip mining is unfounded. For example, it states that mining is the most serious threat to the gray bat. This is unfounded, especially when the animal's normal habitat is limestone caves. Another endangered species, the black-footed ferret, is said to be threatened by strip mining. In fact, farming and farming practices are considered to be the principal cause for the degradation of the habitat. This also applies to the Utah prairie dog. Thus, Table 5–46 describes severe negative impacts as if they are solely resulting from strip mining.

Commenter 069

Response. Appendix H addresses the methodology used to calculate the various environmental factors, including air pollutants. The Regional Impact Summary Comparison (DES, Section 5.3, FES Section 5.2) now preceeds the specific program impacts section and presents key impacts in a series of tables which lists the impacts of the various alternatives as a percent increase or decrease over the No New Leasing base case.

Reference for estimates of individual productivity are included in Appendix Table D–1. Table 5–44 DES (5–62 in FES) is the result of unweighted productivity averages times surface area required (see section 5.3.3.1) and is for comparison purpose only.

Any activity that removes changes or disturbs habitat is a threat to wildlife regardless of whether the species has protected status or not. Table 5–46 DES (5–64 in FES) has been modified to reflect this.

55. **Comment.** "TDWR invites attention to the following specific items in the DEIS relative to water resources which impact significantly on the State of Texas:

a. The analysis of water availability is based on preliminary data pertaining to water flow and consumptive water use compiled by the U.S. Water Resources Council (WRC) (i.e., U.S. Water Resources Council, 1978 (Preliminary Review Copy) — 'The Nation's Water Resource — The Second National Water Assessment', Washington, D.C.). See DEIS at page 5–26, section 5.2.2.6, fourth paragraph under the caption 'Water Impacts'.

b. The DEIS presents water resources data, including total streamflow, and estimated present and future water requirements corresponding to the WRC's Texas-Gulf aggregated subregions (ASR) 1107 (Lower Red River Basin), 1201 (Sabine-Neches Basin), 1202 (Trinity-San Jacinto Basin), 1203 (Brazos River Basin), 1204 (Colorado River Basin), and 1205 (Navidad – Guadalupe – Mission – Nueces Basin) (See Appendix E of the DEIS at pages E–2 and E–6).

"Even though the said water availability data and the related projection methodology are presented with numerous conditions and cautions regarding the validity, applicability, and practicality of the data and methodology, TDWR has more fundamental objections to the use of the said WRC preliminary data. TDWR's review comments, suggested revisions, and point-by-point assessment relative to WRC's draft review report on the 'Second National Water Assessment', were presented in letter dated August 25, 1978, to the Secretary of the Interior. A copy of the said August 25, 1978 letter is attached for ready reference, and special attention is invited to comment 12, thereof. TDWR has been advised that WRC and the Department of the Interior are taking appropriate action to resolve the important problems and questions raised in the review of the Second National Water Assessment.

"Because the Texas Coal Region is not one of the eight coal regions for which the Department of the Interior is preparing separate, detailed environmental impact statements, (see DEIS at page 3–6, section 3.1.1.7, fourth paragraph under caption 'Meeting the Requirements of the National Environmental Policy Act'.), TDWR suggests that final version of the subject programmatic environmental impact statement include assurances that revised, coordinated WRC data relative to the Texas-Gulf Region water availability and demand will be used. TDWR emphasizes the Second National Assessment without substantial revision of the data will not be useful in determining the present and future adequacy of Texas water resources, and that the use of these unrevised data in major energy-related programs may unavoidably and seriously hamper the solution of energy-related problems. Unfortunately, the use of WRC's ASR aggregated water resources data appears to generalize water data beyond the point of being useful. The aggregate, generalized data tend to portray conditions as covering a much broader area than they actually do."

Commenter 056

Response. As requested, the new WRC data will be evaluated when available and incorporated in the programmatic where appropriate if they are significantly different than the data used in preparation of the draft. The ASR data was used because no other options were available to the Department in the time frame available for preparation of the draft environmental statement.

56. **Comment.** "Page 5–28: The discussion of water rights here should include the problem of Indian title to groundwater. The complexity of the issue, the problems of competing interests between the state and Indian water rights and the fact that no final determination of the ownership of the water underlying much of the coal in the San Juan River Coal Region should be addressed in any discussion of the feasibility of coal development in that region."

Commenter 057

Response. Indian water rights are a very complicated topic to address without being site-specific. The DES, page 5–28, footnote 1, addresses the rights of Indian tribes with Northern Great Plains. The footnote and supporting text have been revised to highlight potential Indian rights to water and the effect to coal development such rights might involve.

57. *Comment.* "Page 5–26: Under the section dealing with water impacts the problem of cumulative impacts is very serious. According to the figures in Table 5–10, water demands in the San Juan River Region from coal development could range from 30,000 to 52,000 acre feet per year depending upon the alternative chosen. It is a fact that in the San Juan Basin, where most of the coal development in the Region will take place, the only water available for coal development will come from the Westwater Canyon aquifer. Claims that water can be obtained from the San Juan River are unrealistic and misleading. Information from the New Mexico State Engineer's Office and the United States Geological Survey reveal the following facts.

"Page 5–41: As I have pointed out above no discussion of the availability of water for coal development in the San Juan River Region is sufficient without addressing the realities of the situation which are:

1) Virtually every drop of San Juan River water is already allocated and it is probable that none will be available for coal development.

2) Coal development in the San Juan Basin will have to depend entirely on water from the Westwater Canyon aquifer.

3) Cumulative demands on this aquifer will raise a very real possibility that no water will be available for coal development.

The problems raised here with respect to the water impacts of coal development go to the initial question of whether the entire San Juan River Coal Region should be considered at all for any development. These impacts should be discussed at the national level and should be included in the final Environmental Statement for the Program.

"These problems should also be discussed at the regional level. Again, the Star Lake-Bisti Coal Environmental Statement does not address any of these problems. If the regional statement is approved and implemented the area will be committed to development without the knowledge that there will be sufficient water to support that development."

Commenter 057

Response. It is recognized that water deficits are probably the most significant problem in development of western coal resources. More specifically, it is clear that additional development of coal resources in the San Juan River Coal Region will require a reallocation of existing fully-allocated surface water rights. It is the role of the programmatic environmental statement to identify such adverse impacts. it is up to regional planners and resource use decision-makers to prioritize and allocate scarce resources among competing uses.

It is also noted that the use of deep aquifers may offer some mitigation to the problem of inadequate surface water resources. Use of deep aquifer resources may, however, generate an entirely new set of environmental impacts.

58. **Comment.** "One of the issues overlooked by the DES is the lack of understanding of the effects of the use of fertilizers and irrigation."

Commenter 097

Response. A statement has been added as follows: The use of fertilizer consisting of nitrogen, phosphorous, or potassium have given variable results. In some cases, fertilizer addition has produced favorable results, but this response has

not been consistent. Intensive soil testing of specific sites would be required before fertilizer application.

59. **Comment.** "Later in the same Section (page 5–23, the sixth full paragraph), the statement is made that irrigation cannot be considered a solution for all mines in semi-arid regions simply because water rights are 'usually not available.' This statement is contrary to the experience of virtually every mine operator. Water rights are relatively expensive to develop or obtain anywhere in the West, yet we know of no mine operator who has been unable to acquire such rights either directly by purchase or by appropriation. Presumably this statement is based on a miscomprehension of western water law and the realization that most states consider all or almost all of their watersheds to be fully appropriated already, which may be the case on paper but not in reality."

Commenter 066

Response. The FES text has been changed to read "may not be available."

60. **Comment.** "Table 5–12. This Table also predicts water requirements for coal mining in the San Juan River Region as 62,500 acre feet at the middle range in 1990. However, the Star Lake-Bisti Regional EIS states that this demand will be only 14,488 acre feet in its high-level scenario. This discrepancy must be addressed, for, again, it implies impacts which other Department documents dispute as being too high."

Commenters 019 and 135

Response. As can be seen in the attached table extracted from the Star Lake-Bisti Regional ES, the projected 1990 high level water requirement is not 14,488 acre feet, but rather, 58,936 acre feet. Since the estimate of 62,500 acre feet is for coal extraction and use, the variation between the two reports of 3,564 acre feet (5.7%) represents a reasonable variation attributable to variation in the assumptions made vis-a-vis coal production and use.

TABLE I-11

PROJECTED ANNUAL WATER REQUIREMENTS FOR COAL-RELATED DEVELOPMENT
(acre feet)

	1977	1980	1985	1990
Coal Mines	1,851	3,146	8,006	8,763
Generating Stations	11,715	14,822	30,962	47,997
Star Lake Railroad	0	760	70	70
Fruitland Coal Load Transmission Line	0	5	5	5
Community Water Use	429	1,451	1,510	2,101
Total	13,995	20,184	40,553	58,936

61. **Comment.** "The EIS failed to consider the limitation on coal development due to shortages of water within the western states. Utah in particular has far more development schemes than can be supported by the water available. As is being seen near Delta, agricultural water is being used to furnish water for the IPP plant. Large coal development within this region will take water which could be used for agriculture. One impact of this program would be a reduction in the food production within the region. Clearly the EIS is assuming that national policy is to favor energy production beyond need at the expense of agricultural development."

Commenter 104

Response. The water requirements due to coal development are contained in Chapter 5's water impact section and Appendix E. Where water consumption is excessive, it would be in definite competition with other intraregional water requirements. This site-specific competition is germane to future site-specific analyses. Further, the FES definitely does not assume that the national policy is to favor energy production at the expense of agricultural or other development.

62. **Comment.** "The discussion of groundwater reserves on page 5–41 is quite good. This should provide a rational foundation for extremely limited mining of the deep aquifers of Wyoming."

Commenter 118

Response. This environmental analysis will provide the foundation for future site-specific environmental analyses of any specific tract leasing. Cumulatively, these analyses will be used as a tool to weigh resource trade-off decisions.

63. **Comment.** "Table 5–12: This table might be better explained because in several instances the 'Medium' figure is not medium as related to adjacent 'High' and 'Low' figures. The same is true for tables 5–13 and 5–24."

Commenter 079

Response. The column headings in Table 5–12, 5–13, and 5–24 (Low, Medium, and High) in the DES refer to coal production scenarios as detailed by DOI. The high, medium, and low water measures presented in Tables 5–12, 5–13, and 5–24 are those associated with the three coal production scenarios.

64. **Comment.** "Also, in dealing with water, the Impact Statement does state that most of the coal used in the region is an aquifer itself. I have done a little bit more work on that and have computed that between 182 and 217 acre feet per million tons of coal is actually in that water.

"Now, we can argue about how much can be used and how much can't, but by the year 1990 we would be hauling out eighty-six thousand acre feet of water out of this state just by way of hauling the coal, and I think the Impact Statement—you had better look at that and see what we are doing to this country and whether this is a proper concern."

Commenter 146

Response. The comment has been noted. The assumptions cannot be verified and the conclusions are exaggerated and argumentative.

65. **Comment.** "In Chapter 5 we take exception to the statement the 'Yellowstone River Moratorium' would deplete the flow of the Yellowstone River to the extent it would preclude further processing of coal in the area. We testified in opposition to the Montana Department of Fish and Game's request for 8.2 million acre feet, as well as the request of the Department of Health and Environmental Science's request for 6.7 million acre feet instream flow. Section 5.2.2.6 should be rewritten to include the recent decision by the Board of Natural Resources and Conservation."

Commenter 179

Response. Approval of large instream water rights would *maintain* the flow of the Yellowstone and its tributaries at a minimum specified level, thereby possibly inhibiting the development of new (junior) water rights in those basins.

The Montana State Board of Natural Resources and Conservation handed down their decision ending the Yellowstone Moratorium on December 15, 1978. Based on conversations with personnel of the Montana DWR, it appears that the decision favored the in-stream flow interests and may result in the imposition of an additional constraint on the development of new water rights in the basin.

66. **Comment.** "The impacts attributable to the Federal coal management program would be only a small fraction of those resulting from meeting national coal requirements. (5–9)

"For example, the Department's assertion that the preferred program will not result in significantly greater environmental impacts than a no new leasing alternative is contradicted by its own projections of the relative regional water impacts of the two main alternatives. The Statement's comparison of the water consumption (evaporation) impacts of the various program alternatives shows that, while the total water consumption for the preferred program will be almost identical to that of the no new leasing alternative in 1985, the preferred alternative will result in more water losses from western rivers. (p. 4–59) Because of lower average streamflows, greater streamflow variation, and over-commitments to other uses, the ecosystems of western rivers will be less tolerant of water loss than would be those in the East. Thus, in the case of water, the preferred program is likely to have significantly greater impacts than the no new leasing alternative."

Commenter 089

Response. Nationally the impacts from different levels of leasing are similar. Regionally, which leasing level is chosen results in significantly different levels of impacts. Analyzing these patterns is the goal of the FES (see Section 5.2).

67. **Comment.** "Furthermore, the statement makes no attempt to assess the impacts of major surface water diversions, groundwater withdrawals, and new reservoirs which would be required under the preferred program.

"The statement also fails to assess the consequences of the impact of coal mining-related pollutants discharged into streams whose flows have been reduced as a result of coal development. The water flows predicted in some regions during periods of low flow are small, indicating that the

impact of chemical and sediment loading on streams is likely to be significant. The statement does discuss surface water shortages during periods of low flow in the Texas, Powder River, Denver-Raton, Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan Coal Regions (pp. 5–33 to 5–47), but again it neglects to discuss the consequences of these shortages or of the impacts of measures taken to avoid them (*i.e.,* the construction of new reservoirs).

"Finally, the Department's approach does not provide an adequate comparison of the water impacts of the preferred program with those of the no-project alternative. First, the statement glosses over the difference in regional water impacts resulting from each of these options."

Commenter 089

Response. Section 5.3.2.6 Water Impacts has been substantially rewritten to address previous deficiencies with regard to the treatment given to water availability and quantity.

68. **Comment.** "It appears that the development of the Western Interior Region may bring about some reduction of flow in the Mississippi River along the state's eastern border and that development of the Fort Union Region may bring about more drastic reduction of flows in the Missouri River along the state's western border. Especially distressing is the following: 'Table 5–20 indicates that up to 14 percent of the annual average flow for this (Missouri) river basin could be required. Up to 38 percent of the 20-year low annual supply would be required in 1985.' Page 5–41, *DES, FCMP*"

Commenter 011

Response. Table 5–20 of the DES refers to the upper Missouri River basin of the Powder River and Fort Union Coal Regions. These regions are located approximately 500 miles upstream from the segment of the Missouri River which form Iowa's western border. Due to the fact that numerous other tributaries feed the Missouri over this 500 mile river segment, Iowa would not be affected by the indicated magnitude of water reduction. The actual impact in Iowa would be minor.

69. **Comment.** " The Department mistakenly concludes that the impacts of the preferred program will be little greater than those of the no-project alternative.

"As we have discussed above, a major flaw in the Draft Environmental Statement is its failure to examine realistic alternatives to the preferred program. The alternatives examined in the DES, not leasing, emergency leasing or leasing to meet industry, state or DOE requirements, are not independent coal management programs. There are ways of answering one of the questions which a coal management program must answer: how much to lease. The most significant alternatives which the Department failed to consider is a program whereby new leasing is deferred until such time as it is clearly needed to meet future energy requirements, and whereby existing leases are managed in such a way as to balance environmental and economic concerns. It is likely that the environmental impacts of such a program would be quite different from those of continuation of the status quo, termed by the Statement as the no-project alternative.

"Because there are a variety of no-project alternatives which would have lesser environmental impacts than the 'no new leasing' alternative discussed in the statement, the Department's comparison of the environmental impacts of the preferred program with those of the no new leasing alternative gives the misleading impression that the impacts of the preferred program will be only marginally greater than those of a program which is explicitly designed to ensure full protection of environmental values in the development of Federal coal."

Commenter 089

Response. The major management alternatives used for this ES blanket the range of possible decisions by the Secretary. As is pointed out, the permutations in coal management decisions are endless; we do not believe the impacts of these different alternatives will, from a national viewpoint, change impact levels significantly. The preferred program described here would result in a balanced approach to coal leasing decisions. While this ES has reported a level of leasing to the preferred program for the purposes of analysis; this alternative does not in fact carry with it any pre-determined level of leasing.

70. **Comment.** "In a related factor, only land disturbance caused by the presence of mining operations, beneficiation, conversion, use and transportation of coal has been considered. This is

unacceptable. Surface mining of coal necessarily requires human involvement, as reflected in projected population increases. However, areas which will be temporarily or permanently disturbed for residential, commercial, industrial and governmental structures, ancillary support structures, recreation, and corridors for the service and utilities of such populations have been ignored. Stating that the 'multiplicity of site-specific factors which would dictate acreages committed to such developments' renders quantification 'beyond the scope of this document' is not a statement of environmental impact. It may be noted that residential development has traditionally taken place on the best agricultural lands, because that is where towns have been historically located. Expansion of existing urban areas to serve energy booms will only expand the agricultural losses."

Commenter 097

Response. Secondary land disturbance is quantified in the ES where it is felt that reasonable estimates could be made. Secondary impacts related to coal development including induced growth and community change are covered generically in Section 5.3.4. An estimate for the amounts of land required to support coal-related population increases has been added to the discussion of land disturbance. The factors which contribute to make land "prime farmland" are also often the best characteristics for other land uses.

71. **Comment.** "Some characteristics of the data presented concerning land disturbance are not clearly explained. Table 5-5 indicates that, for the low and high coal development scenarios, the preferred program would lead to more acres being disturbed than the 'no new leasing' alternative, but would lead to less for the medium level of coal development. (p. 5-18) It is not clear what factors are responsible for such conclusions."

Commenter 089

Response. Acres disturbed are based on coal production estimates. Where medium coal production level estimates are higher than high-level production, a shift of coal production to other regions is indicated. Land disturbance reflects this shift.

72. **Comment.** "On page 5–73 and Table 5–44 the term is meaningless. Productivity, being a rate measurement, is a function of time; however, no explanation of the time interval involved is given for the data. Because productivity rates are inherently different among the coal regions, the procedure in this section of comparing productivity levels used throughout the document are suspect."

Commenter 088

Response. This section is being rewritten to clarify the time aspects of productivity.

73. **Comment.** "Furthermore, the statement completely ignores long-term and cumulative ecological effects: no consideration is given to impacts after 1990. (p. 5–3) Although it is difficult to assess long-term ecological effects of specific stresses, some comments can be made regarding potential consequences of coal development. For example, strip mining thick beds with shallow overburden can significantly alter drainage and erosional patterns. Mining can alter the quality and quantity of both surface and ground water, alter soil characteristics, and change the topography and geology of the land. Soils in arid and semi-arid climates recover very slowly, so loss of productivity could be a significant factor. While the statement assumes a return to original productivity, alteration of the environment may prevent it.

"Thus, the numerous environmental changes associated with coal development could diminish the ability of an ecological system to reestablish itself. If reestablishment is not attained after some period of time, then the fragile, low-density food webs of most western coal regions become very susceptible to disruption. As can be seen from the statement's list of endangered species in the western coal regions, (pp. 5–77 to 5–80) flora and fauna in these areas are already stressed; additional burdens caused by coal development may make extinction a real possibility.

"In short, the statement's discussion of the environmental impacts of the proposed program does not fully assess the consequences of Federal coal leasing to the natural ecosystems of each region. In order to provide an adequate analysis of the total environmental impact of the proposed program, the statement must relate its estimates of the 'loading' upon the environment to the long-run ecological consequences of such disturbance."

Commenter 089

Response. Section 5.3.3 discusses impacts on ecosystems in terms of productivity loss, habitat

losses, and endangered species. Appropriate material will be included in 5.3.3 to address more clearly the issues raised in the comment.

74. **Comment.** "The second one is existing vegetation would be destroyed on sites cleared for development and surface mining, wildlife habitat would be lost or temporarily displaced. Well, on the east side of the state the ranchers are always setting fire to the grass and burning it off for one reason or another. It is a little bit hard to be sure of. Sometimes for good, maybe for bad, I don't know. It depends on whether you get caught in the fire at the time it gets burned off. As far as the wildlife goes, I am sure that we don't get too concerned about the hunters going out and hunting the quail. It is my understanding the quail are going to die whether the hunters shoot them anyway. This is kind of getting at little things about how the wildlife is going to be affected. That is greatly overdone. I think the wildlife is more likely to come in because they will find more food around where there are people. If you want to take it from that point of view you might have more wildlife than you would have if there wasn't anybody out there."

Commenter 139

Response. Wildlife impacts due to the implementation of a Federal coal management program are most certainly within the scope of the FES and merit analysis while the wildlife effects due to the actions of ranchers, hunters or other non-Departmental actions do not.

75. **Comment.** " The statement does not assess the long-term impacts of the environmental stresses which will be caused by the preferred program. The statement acknowledges that the preferred program and and other alternatives involving significant amounts of coal development will create serious environmental stresses in the regions where coal is mined. However, it does not attempt to estimate the impacts that these stresses will have on those regions. We believe that an evaluation of the long-run consequences on particular species and ecosystems within each region is also essential to any decision concerning Federal coal leasing policy.

"To its credit, the statement does attempt to address the issue of ecological impacts. Unfortunately, the assessment is too superficial to be meaningful; moreover, it relies once again on some questionable assumptions. For example, the statement estimates plant and wildlife losses by multiplying plant and wildlife densities by the estimated number of acres directly disturbed by coal development. (p. H–26)"

Commenter 089

Response. Estimates of land disturbance over the long-term and short-term have been revised in Chapter 7 to indicate the amounts of land that would be committed in regions for each of these broad categories. The long-term consequences on specific species and ecosystems can only be generalized at this alternatives level of analysis (see section 5.3.3). Once specific sites are identified, impacts specific to the type of activity and the area being affected can be assessed in detail.

76. **Comment.** "The potential impacts of subsidence on water availability in springs and seeps water and mesic micro-habitat sources extremely important to wildlife, should be addressed more fully in Section 5.2.2.6, page 5–26."

Commenter 093

Response. Any area adjoining an excavation is normally subjected to increased stress as a consequence of the redistribution of load. This may be at the front of, or at the sides or rear of, a working face. Changes, diversions, or pollution of surface or underground water may occur, and pits and cracks may result due to these stresses, resulting in increase of soil moisture in some areas. A change in soil moisture may lead to a change in plant cover which would result in a change in wildlife habitats. These changes are highly site specific and could be beneficial or detrimental to wildlife.

77. **Comment.** "The discussion of wildlife disturbance and destruction is not adequate in the DES. The document indicates that larger, more mobil wildlife will rarely be killed (5–72). But the Eastern Powder River Coal DES finds 1,947 game mammals will be destroyed, along with 200,651 nongame. This is in addition to the loss of 280,359 birds. Further, the above statistics say nothing about car, 'domestic pet,' and wanton killings. These forgotten factors arguably kill more wildlife than the loss of habitat."

Commenter 118

Response. The document reads "while *direct* mortality of larger, more mobile wildlife species would be rare....." in the generic discussion of

ecological impacts. In Section 5.3.3.2 (habitat loss) and in Appendix D tables D–4 through D–25 estimates of potential wildlife losses due to habitat loss are presented. Increased traffic, pets, and illegal hunting will surely result in additional losses which cannot be reasonably estimated at this level. It's possible for a habitat to exist without wildlife, but unlikely that wildlife can exist without a habitat.

78. **Comment.** "The Section on Ecological Impacts beginning on page 5–72 appears to contain some conflicts. On page 5–75, the following statement appears: 'Since the specific tracts which may be leased are presently unknown, it is not possible to indicate the exact habitat which would be lost.' Several paragraphs later, reference is made to table 5–45 which represents estimates of potential big game population reductions which would occur due to habitat loss. Since it is not possible (as previously stated) to indicate the exact habitat that would be lost, then how can potential big game population reductions which would occur due to habitat loss be calculated?"

Commenter 121

Response. Potential big game population reductions were derived by using estimates of population densities of occupied habitat multiplied by estimates of acres required for coal development (See Appendix H.4.4 for more details).

Since specific tracts are unknown, a land use forecast was developed for each region which alloted percentages of the estimated land required for coal development to forest, range, cropland, pasture and wetlands. Potential big game population reductions (and other wildlife as well) were then determined by multiplying estimates of population densities of occupied habitat by acres of habitat (as determined by the land-use forecast). Details of the steps used to estimate the various components of this methodology are given in Appendix H.4.4. It is important to recognize that these are estimates based on a set of assumptions and that actual reductions may vary considerably once specific areas are defined.

79. **Comment.** "In addition, the DEIS could be improved with a benefit/cost analysis and economic comparison of the various proposed actions and alternative mitigation measures, since it is important to strike a balance between economics and environmental impacts."

Commenter 117

Response. While it is entirely appropriate to strike a reasonable balance between the extremes of environmental preservation versus economic development, it is beyond the scope of this programmatic environmental statement to develop the data necessary to adequately address the issues of cost/benefit analysis. Further, since the regions evaluated encompass such broad areas, the number of qualifying assumptions would, of necessity, be so extensive as to render useless any serious attempt to quantify program-wide costs and benefits. A far more appropriate setting for such analyses would be the regional impact statements, where the regional impacts, costs and benefits could most adequately be described. Economic factors are incorporated in the Secretary's decisions on the Federal coal management program.

80. **Comment.** "The DES indicates coal related population growth would reach 'hyperurbanization' levels in the Powder River *without any new leasing* (5–85). Under the preferred program medium level, the annual growth rate would be approximately 14.2%, creating an even worse situation. Might this be turbohyperurbanization?"

Commenter 118

Response. The text of the FES has been modified to more fully discuss the social and economic impacts of boom town developments.

81. **Comment.** "Unfortunately this draft fails to recognize, as some Federal legislation fails to recognize, that those jurisdictions which experience the most severe adverse impacts may not be the same as those which accrue the chief tax benefit. The statement implies that an increase in population is accompanied by an eventual increase in taxable valuation which eventually catches up with the cost of the additional demand for public services and facilities. In cities, towns and school districts this is not necessarily so: the catch-up may never occur. In that circumstance, loans can be part of the burden they are intended to alleviate and grants are much preferable. We are all familiar with interstate jurisdictional inequities, but they also occur within the state and it does not appear they can be completely nor equitably addressed by the state's adoption of any single jurisdictional mechanism, such as tax base sharing. By the same token, the statement suggests prepayment of taxes as a mechanism to help off-set tax lead time

problems. Although Montana has legal provisions which would allow prepayment of taxes, every time prepayment has been proposed industry has threatened to challenge its constitutionality."

Commenter 121

Response. The commenter is correct in noting the interjurisdictional nature of fiscal impacts potentially arising from coal development. Section 5.3.4.5 is being revised to incorporate this impact in the discussion of tax lead time impacts.

82. **Comment.** "The draft implies a minimal responsibility on the part of the Federal government for providing what we consider to be highly appropriate financial assistance to help mitigate adverse impacts. The statement is made: 'The task of providing mitigation rests primarily with states.' Montana has taken a lead in the nation in assuming its responsibilities toward the coal area through the establishment and use of our coal severance tax and our innovative approach to assisting impact communities through the Montana Coal Board. Recognizing that energy impact extends beyond the coal area, we are continuing to evaluate our role and to explore new possibilities. Montana has the highest coal severance tax in the nation—and it is currently subject to challenge by the energy industry. We, therefore, find it ironic that in discussing the inadequacy and unresponsiveness of existing Federal aid, the Department of Interior should recommend that 'the more severely impacted states such as Wyoming and Montana could seek to raise revenue by other means, for example, through the imposition of an increased coal severance tax'."

Commenter 121

Response. Reference to the State of Montana has been deleted from the quoted material.

83. **Comment.** "In addition to the environmental impacts, the National Wildlife Federation is concerned about the socio-economic ramifications of coal production of the magnitude expressed by Department of Energy projections for 1985 and 1990. The problems associated with the transformation of most of these geographic locations from an agricultural lifestyle to urban, industrial lifestyles include not only the physical implications discussed in the impact statement—a shortage of housing, health, recreational, and educational facilities; and inadequate police, fire, and water and sewer provisions—but metaphysical consequences such as juvenile deliquency, alcoholism, drug abuse, serious emotional problems and increased crime rates. These are more than 'socio-economic' impacts—they are reflections of the dramatic transformation of a lifestyle chosen and enjoyed by the inhabitants of the Western States."

Commenters 160, 071, 123, 146, and 057

Response. The text of the FES reflects the existence of the mentioned metaphysical consequences, particularly as they relate to areas expected to experience rapid population increases (i.e., creation of hyper-urbanization or boom towns). However, the coal management program is not expected to generate lifestyle transformations as geographically broad as implied in the comment. Rather, population increases would be most rapid in areas expected to experience a concentration of energy-related development activities, while the broader coal region would experience more moderate increases.

84. **Comment.** " The preferred program does not adequately provide for consideration of cumulative social and economic impacts of leasing federal coal. The question of how, where and when the coal will be consumed (its end-use) is critical to this consideration."

Commenter 061

Response. The cumulative social and economic impacts of coal development will be assessed by production region and, indeed, is the main thrust of this analysis. The impact of regional coal consumption will be part of the regional lease sales EIS.

85. **Comment.** "What is considered 'high to moderate' development potential? Why not encourage low development potential which might be more suitable and sensitive to local demand?"

Commenter 118

Response. The terms refer to the potential economic feasibility of mining the coal deposit. Coal of low-development potential is, by definition, very costly to produce and would not be in demand, even locally. If anyone believes that he has information on a coal deposit that would change the USGS's determination of its development potential, he can present it to the Department, which will, if the presentation is reasonable, include the suggested coal deposit with the coal classified as having high or medium development potential.

86. **Comment.** "It is on Page 5–83. 'The goal of maintaining a physical and social environment consistent with tradition is not realistic. Residents who cherish this way of life will be forced to tolerate changes.' As I said, I find this really disturbing. You are making judgments about our lifestyles, how we should live. You have demonstrated a fairly keen prejudice against the rural lifestyle."

Commenter 161

Response. The FES does not make any judgment about how one should live, rather, it assesses the sociological changes which are anticipated to occur due to the adoption of a Federal coal management program.

87. **Comment.** "As a general note on Chapter Five, the impact section does not describe beneficial impacts from mine development; and does not discuss the economic benefits received from coal severance tax money. In addition, the statement should also describe the positive economic benefits of developing coal tracts within a particular region."

Commenter 089

Response. The commenter is referred to Section 5.3.4.2 which addresses the new jobs created and Tables 5–77 and 5–78, Projected Coal Royalties and Severance Taxes. Statements relating to the positive economic impacts accruing to a community due to coal production are included in Chapter 5 to amplify these points.

88. **Comment.** "The ES ignores non-coal related growth in the regions (p. 5–9) and analyzes only the direct impacts of development on socio-economics and the land. Both are contrary to established ES procedures and prevent the statement from presenting the total impacts development would have. Furthermore, all the impact analyses in the document are based on the assumption that underground mining produces no air pollution and no short- or long-term land disturbance (pp. H–34, 45, 56–108). This is another in the series of absurd assumptions on which the ES is based."

Commenter 158

Response. The objective of this programmatic environmental statement is to address coal-related development impacts. It is beyond the scope of this statement to address non-coal related growth.

Emissions from underground mining are assumed to be negligible compared to surface operations because of the widespread use of electrical equipment. Underground mining air emissions are addressed in Section 5.3.2.

Estimates of land disturbed have been revised for the FES. Incorporated in the revision to Section 5.3 is consideration of land committed on a short-term basis to roads, buildings, tailing piles, etc.

89. **Comment.** "In Section 5.2.4.1, a lengthy discussion is made of the assumptions used in projecting the population increases due to the new federal coal leasing and the resulting socio-economic impacts. On page 5–83 (second column) and near the beginning of page 5–85, are comments which indicate that those impacts assumed are based on increases in population which combine short-term increases due to major construction as well as long-term employment in coal mines and supporting services.

"Similarly, these impacts are based on figures which do not reflect any assumptions concerning the number of new people which would come into an area and the number of jobs related to new federal coal leasing which would be filled by present residents of an area. These two factors greatly exaggerate the socio-economic impacts of new federal coal leasing. This is particularly true in areas such as central Utah, where certain counties which would be directly impacted by new federal coal leasing are experiencing relatively high levels of unemployment or underemployment which would be alleviated by coal development without many of the related environmental impacts that occur when new residents move into a rather sparsely-populated area. Therefore, it is urged that the Department make a concerted effort in the final impact statement to relate current unemployment figures to influxes of population resulting from new federal coal leasing to develop not just the "worst case" picture again, but also to show to what degree the employment of existing residents in coal development projects and/or supportive services would reduce the projected environmental impacts. Many residents of the West are particulary opposed to any developments which would bring in large numbers of "outsiders." It is important to public support of the new federal coal leasing program and to the blunting of any

opposition based on population increases that the Department put such population increases in proper perspective by indicating to what extent existing residents might reduce immigration problems."

Commenter 066

Response. The objective of this programmatic environmental statement is to attempt to estimate overall levels of impacts associated with a Federal coal managment program. As such, it is inappropriate to attempt to specify alternatives designed to provide solutions to county-level problems. Further, the "worst case" impact represents an extreme impact level. In all probability, this level of adverse impact would not occur.

90. **Comment.** "In Section 5.2.4.4 (the second full paragraph on page 5–96), the basis for projecting fiscal impacts on state and local government agencies is described as being based on admittedly overstated population shifts which assume, incredibly, that all population shifts would be interstate. It continues to be confusing and frustrating for the Department to be making assumptions on one page and then contradicting the same assumptions with completely unjustified assumptions on the next page. Although it might be helpful to present the 'worst case' scenario for physical impacts in order to avoid any criticism that the Statement is inadequate for failing to at least mention all possible impacts, it is basic to an objective analysis that the Statement also demonstrate what the Department considers to be the most likely situation so that published reports of the Statement or comments taken out of context by groups opposed to new federal coal leasing programs will not unduly alarm state and local governments to enact new taxes or increase existing taxes in preparation for problems based on wholly unrealistic assumptions."

Commenter 066

Response. It has been assumed that all population shifts will occur on an interstate basis to insure that the "worst case" impacts are presented. Some population shifts will occur on an intra-state basis; this does not imply that fiscal demands accompanying such intrastate shifts will "net out" to zero. Rather, those shifts into areas with inadequately developed infrastructures will result in additional fiscal demands.

The Department cannot control the ultimate use of specific sections of the environmental statement. It must, however, comply with all applicable law. In doing so, the worst case impact is presented.

91. **Comment.** "The population increase figures assumed by the Department are apparently in direct conflict with statements made on page 5–87, at the beginning of Secion 5.2.4.2 to the effect that the principal source of labor for western coal development can be expected to be western workers in agriculture and to a lesser degree, in the construction industry. Here the Department is acknowledging that many existing residents of the West will be available to fill coal development-related jobs, thus making the exaggerated assumptions of the amount of in-migration even more unrealistic."

Commenter 066

Response. The existing supply of excess labor, on a regional basis, will be inadequate to meet total additional local labor demands. To present estimates of "worst case" impacts, it was necessary to assume all migration would be on an interstate basis.

92. **Comment.** "Page 5–82: The discussion of impacted communities is inadequate in the following respects:

1) Although it is stated that a growth rate of more than 10% on small communities would require special planning, no discussion is made of what effects any population increase would have on areas where there are essentially no services, as would be the case throughout the San Juan River Region.
2) No discussion is made of impacts on communities where there are no services, no housing and no private land on which to build these things.
3) No discussion is included about the boom-bust phenomenon experiences in areas which have sudden development but which have no structure to hold the influx of people after the development."

Commenter 057

Response. The material suggested by this comment is included in the final statement; see, for example, Section 5.3.4.2.

93. **Comment.** " No discussion is included about the effects of increased population on Indian communities, where English is not spoken and traditional lifestyles are dominant.

"These issues must be addressed in the final statement."

Commenter 057

Response. Additional text addressing the effect on Indian communities has been inserted in Section 5.

94. **Comment.** "Similarly, impacts on state and local expenditures have been diluted by considering only the impact in comparison with total budgets of all state and local governmental units. A 1990 impact on government expenditures in Colorado seems miniscule, but in real terms the $16 to $33 million will be mostly spent by local communities with budgets which are presently almost invisible."

Commenter 097

Response. While the commenter is correct in stating that the annual fiscal impacts on local budgets will be substantial, it is beyond the scope of this programmatic environmental statement to attempt to quantify impacts at the local level. Rather, the appropriate regional and site-specific impact statements would be the vehicle to identify, quantify, analyze and, where necessary, mitigate such impacts.

95. **Comment.** "It appears that Chapter 5 of the statement should include a discussion of the impact on utility bills from the preferred program and alternatives."

Commenters 013 and 197

Response. The Department has prepared an analysis of the impact on utility bills of no-new-leasing alternative vis-a-vis the preferred program as part of its study of the sensitivity of the DOE model. This analysis was not available in time for incorporation in the draft ES. It has been incorporated into Chapter 2 of the final ES.

96. **Comment.** "Page 5–96. Fiscal Impacts - Alternate funding for front end developments are loans or direct assistance.

"Loan programs would not assist the highway developments as future increases in highway development due to coal development would be minimal and not sufficient to repay loans. The EIS should recognize that specially funded programs such as highways should receive direct assistance."

Commenter 014

Response. The FES does not specifically refer to highway funding programs. It is recognized that highway funding is normally conducted via direct governmental assistance. The basis, however, for governmental funding is taxes; coal development is one means of increasing an area's tax base.

97. **Comment.** " Other concerns involve the Department of Agriculture programs under SCS such as the P.L. 566 Program. A number of watershed developments are underway or planned. It is felt mining might cause surface problems on watersheds and also in the '208' non-point pollution program."

Commenter 001

Response. The statement recognizes that mining activity may cause surface problems on watersheds. However, this issue will be assessed on a site-specific and regional basis as subsequent plans are developed. Federal and State laws pertaining to water quality provide criteria and standards which must be met by any development. Leases issued will require conformity with established State and Federal water quality standards.

Chapter 5 in the final statement provides a discussion on water impacts in the 12 Coal Regions.

98. **Comment.** "Again on page 5–94 (bottom of first column), reference is made to Table 5–54 as containing projected increases in population due to construction of coal development-related facilities. These comments recognize that part of the increase is due to a national surge in construction of new combustion facilities but it also notes that the data is based on the assumption of the possible development of significant numbers of synthetic fuel plants. Earlier in the Statement, the Department clearly stated that, in general, its environmental impact policies contained in Chapter 5 will be based on the assumption that the end uses of coal would, during the unforeseeable future, not vary significantly from the present uses which are primarily for the generation of electricity and secondarily for conventional industrial boiler use with negligible or no synthetic fuel development. There would appear to be no justification for making an exception to this general observation in analyzing population increases. To assume signifi-

cant population increases from synthetic fuel plants can be unnecessarily alarming to existing residents in regions to be impacted by any new federal coal leasing program."

Commenter 066

Response. The assumptions incorporated in the impact analysis methodology (see Appendix H) clearly indicate that synthetic fuels development will occur by 1985, albeit on a limited scale. The purpose of including such development as a basis of impact projection is not to cause alarm, but rather, to provide an objective estimate of future population-related impacts.

99. **Comment.** "In the San Juan River Region, most of the coal lies in New Mexico, yet only the severance tax is used in computing economic benefit to the State.

"Actually, the severance tax is only a small part of *direct taxes* which New Mexico receives from coal production."

Commenter 136

Response. This comment is correct in stating that many different sources of tax revenue to the states will become available with increased coal production. However, the programmatic statement addresses severance taxes and royalties on an individual state basis because of their direct relationship to the amount of coal mined. The level of revenue from other taxes, such as sales, property and income taxes, will be more a function of land area used, employment levels, and income distribution patterns rather than coal roduction.

100. **Comment.** "Page 5–94: A discussion of who will bear the financial impacts of coal development in Indian communities should be included here. Much coal activity is planned for Indian areas which are not on a reservation and the issues of who will bear the costs is pertinent here.

"Here again there is a problem of what will be done in Indian areas with no tax base."

Commenter 057

Response. Developmental pressures will be most severely felt in those areas with no or little infrastructure. Indian communities will be severely affected by such pressures attributable to increased levels of coal resource utilization. Section 5.3.4 is being revised to include consideration of this comment.

101. **Comment.** "The impacts on prime farmland and other agricultural land by coal mining activities are discussed but no specific consideration is given to revegetating farmland that has lost its water supply. These lands may become subject to wind and water erosion because of inadequate vegetative cover, even though not disturbed by mining operations. Measures should be taken to reestablish native vegetation that can survive in an arid climate without irrigation before the water supply is removed."

Commenter 116

Response. Measures to prevent erosion (wind and water) either through revegetation or other means are an important part of any premining – mining – or post-mining planning process. These measures would be part of an adequate reclamation plan required for a mining permit.

102. **Comment.** "It seems questionable whether the section addressing loss of agricultural lands and productivity represents the situation fully – for example, the chart illustrating the costs to agriculture cannot fully reflect the adverse impact on agriculture because it does not take into account the potentially extensive and extremely detrimental disruption of the region's aquifiers or possible increases in animal mortality because of air or water pollutants. These must be matters of concern to us as an agricultural state and as a nation which benefits from our agricultural productivity."

Commenter 121

Response. Adverse impacts to agriculture due to aquifer disruption would be dependent upon factors including: how development actually occurs and to what extent the aquifer was disrupted. Aquifers are protected under the Surface Mining Control and Reclamation Act of 1977. Similarly, effects of air and water pollutants are dependent upon increases over ambient levels considered harmful. Both areas would require more detailed site-specific information before impacts could be quantified.

103. **Comment.** "Page 5–94: The evaluation of where the work force for coal development will come from is based on the assertion that agricultural workers will be available for the work. In the San Juan River Region there are virtually no agricultural workers to draw upon. Virtually all employees in the coal development will have to come from outside the area. This influx of

outsiders constitutes a considerable impact and should be discussed.

Commenter 057

Response. This impact is considered in Section 5.3.4 of the FES, and is further reflected in Tables 5-65 and 5-66 of the FES.

104. **Comment.** "The third one is that present agriculture use in some areas would be converted to residential, commercial or industrial uses. Well, what is so bad about that? You read about the chamber of commerces all around the state, how they are growing and how the business is good and how this is going to be great for New Mexico, you read how New Mexico is increasing in population and it is always below Arizona, it is always below Colorado, it is always below Utah and it is way below Texas, yet we are afraid of a little increase in population or the building of a few houses. I can't see that that is bad. I am glad I built my house when I did. Maybe now I would have to file an impact statement to build it.

"The fourth one is industrial-municipal demand for water would increase. Generally water would be available for these uses when in some western states new demands compete with present water uses and the competition will cause price increases that may cause economic problems to agricultural water users. Well, the farmers are using the water and there is increased use on the part of the farmers, so why do you have to single out the miners for using some water?"

Commenter 139

Response. The purpose of the FES is, among other things, to assess the effects of a Federal coal management program on agriculture and water consumption It does not make a judgement as to whether these effects are good or bad.

105. **Comment.** "In summation, agriculture is necessary, and the depredations which it is suffering currently will be exacerbated by the proposed coal scheme. Losses will be permanent in some areas, and temporary in some areas. Long-term losses will also be created in less noticeable ways, such as yield decreases in response to air quality degradation in areas which are now relatively clean. The draft EIS fails to address these impacts on uranium."

Commenter 017

Response. Areas with relatively clean air quality will experience some air quality degradation if development occurs in these areas. Whether emissions will be sufficient to lower crop yields cannot be determined on the broad scale required for a progammatic ES (see 5.3.2.7).

106. **Comment.** "Page 5-94: The evaluation of impacts to agriculture based on the dollar value of the productivity of an area does not allow consideration of the very real impacts to areas where people grow or raise only enough to support themselves. These situations must be addressed."

Commenter 057

Response. Because this is a programmatic based on broad regions, impacts are necessarily general in nature. As sites become better defined more specific impacts and areas of impact can be better defined. Generally, the impacts on farm profits can be interpreted as an indication of impacts on any agricultural activity.

107. **Comment.** "There are also secondary impacts such as the loss of older buildings when a town grows due to coal mining. This is mentioned, but probably should be enlarged upon. The Colorado State Historic Preservation Officer considers it the responsibility of the Federal government to mitigate secondary damages on private and other lands caused by coal leasing. While this position is questionable, we need to be aware of such policies."

Commenter 025

Response. The nature of a programmatic environmental impact statement precludes the inclusion of site-specific details. Thus, mitigating measures to be undertaken to preserve for example, the older buildings of a town that might be affected by coal-related development activities cannot be addressed except in a generic way. When environmental impact statements are prepared for a coal leasing activity under the Federal coal management program, potential impacts on a site-specific basis would be discussed. At that time, coordination would be required between the land management agency involved and the appropriate State Historic Preservation Office to mitigate the kinds of impacts like the example cited. The determination of whether the Federal, state, or local government has the primary responsibility to mitigate undesirable secondary impacts would be decided during the coordination process.

108. **Comment.** "Page 5–104 — Paragraph 5.2.4.8. Recreation Impacts. Should be clarified that coal mining *may* cause significant changes in population distribution and concentration in certain areas, thus impacting certain recreation facilities. Coal mining does not increase the population as implied."

Commenter 119

Response. Population "loading factors" were incorporated in the CIEP to estimate population change. These loading factors are supported by numerous field studies which indicate a direct relationship between coal production, associated population levels and the level of services generally demanded by an average population. This programmatic statement addresses the population impacts associated with coal development and identifies the secondary impacts, such as recreation impacts, stemming from coal resource development. Consideration of impacts on specific recreation facilities is most properly addressed in the regional and site specific mining studies required prior to coal production.

109. **Comment.** "Moreover, each environmental statement should address not only how the project will affect the recreational use of the land itself, but also give some thought to how the impact of people could hinder or enhance the quality of the environment. The impact of needed recreational areas and/or facilities to cater to an increased population, should be considered in this Federal Coal Management Program."

Commenter 122

Response. Section 5.3.4 of the FES discusses generically the impact of additional people on an area's recreational facilities. As stated in this paragraph, a detailed determination of recreational-related impacts is highly dependent upon a variety of locally specific factors that are beyond the scope of a programmtic ES. Regional or site specific ES's would be able to detail such impacts.

110. **Comment.** "One specific error was noted in this section. A 100 car unit coal train with 5 locomotives and a caboose is 1.1 miles is length rather than 1.6 miles."

Commenter 114

Response. The text of the DES has been modified accordingly.

111. **Comment.** "Union Pacific is concerned particularly that the non-quantifiable impacts of increased coal transportation by rail not be exaggerated. As stated in the two preceeding sections, it must be recognized that all rail traffic is increasing, not just coal. Furthermore, it has been Union Pacific Railroad's experience that problems caused by operations of a railroad through a community seldom stem from either the length or freqency of trains. What problems do exist are often compounded because community leaders do not know how to contact those representatives of the railroad who may be in a position to provide a solution. In keeping with its generally perceived role as a good corporate citizen, this Company is continually involved in working to improve such communications and community relations in general.

"Apparently as a means of mitigating environmental impacts, transportation access is mentioned as being a factor which might limit the areas in which new Federal leases would be issued. Union Pacific concurs in the conclusion on page 5–115 that any such restriction would only delay, and not prohibit, new leasing in limited access areas. Union Pacific does not view transportation access as a stumbling block for the Federal coal management program simply because, as recognized in Section 5.4.4, major coal related rail extensions will only be built if the total mining project, including transportation facilities, is economically sound. In fact, Union Pacific's existing system provides ready access to several of the coal supply regions identified in the Draft Environmental Statement as containing significant reserves of Federal coal. Transportation access will only present a problem if necessary rights-of-way to serve coal mines can not be obtained across state or Federal land. It is assumed that rights-of-way across public lands will be available if leasing of Federal coal is permitted in a given area."

Commenter 114

Response. While impacts may not in all instances stem from train length and frequency, these factors do exacerbate problems created at many unseparated grade crossings. It is agreed that more open communication can mitigate problems. For example, railroads are receptive to citizen calls to assure that stopped trains are "cut" to prevent unnecessary blockage of grade crossings.

112. **Comment.** "As pointed out in the preceeding section, system capacity will have to be increased to handle all freight, not just coal. Consequently, the railroads' ability to make the financial investment required to provide adequate transportation services for all commodities must be considered. The Draft Environmental Statement properly takes such an approach and does consider financial capability in terms of the total investment required by the railroad industry to provide transportation services for both coal and other freight. In this context, it should also be recognized that revenues from coal traffic will certainly improve the railroad industry's financial ability to improve the country's rail transportation system with obvious benefits to all rail shippers."

Commenter 114

Response. No response required.

113. **Comment.** "The impact of coal traffic on system capacity must be viewed from the perspective that coal is only one of many commodities carried by railroads. System capacity must be increased to handle growing volumes of all freight, not just coal. This point is recognized in the introduction to Section 5.3.5.1, but it should be specifically emphasized in the discussion of system capacity.

"It is correct that capacity for a given segment of track is 'a function of line mileage, the number of tracks per line, the length and spacing of sidings ..., the type of signaling system and train control, traffic imbalance and peaking patterns, and track conditions.' Union Pacific is committed to insuring that its track system has sufficient capacity to handle projected increases in all rail traffic. In addition, Union Pacific recognizes that some segments of branch line trackage may require upgrading primarily in order to accommodate increased coal traffic in a safe and efficient manner. For example, the Company is currently replacing ties, relaying rail, lining and surfacing a 114 mile section of its North Platte branch in order to handle Powder River Basin coal traffic interchanged from the Burlington Northern at Northport, Nebraska."

Commenter 114

Response. While it is recognized that system capacity must be increased to handle growing volumes of all freight, the projected annual growth rate for noncoal traffic is significantly less than that for coal. Accordingly, increased coal traffic would be a dominant factor in decisions to upgrade capacity, particularly for the major main lines in the western coal states.

114. **Comment.** 'With respect to projected shortages of coal hopper cars and locomotives, it appears that the increased efficiency resulting from effective equipment management programs has been overlooked. Union Pacific is working with coal shippers, including electric utilities, to develop such efficiencies. While it is probably true that some increase in locomotive and hopper car production will be required to meet future demands, efficient equipment management can, in part, mitigate the projected car shortages."

Commenter 114

Response. The degree to which efficient equipment management would mitigate projected car shortages cannot be quantified. For example, improvements in turnaround time for unit trains through greater train speeds and more mechanized loading and unloading facilities would reduce equipment shortages. On the other hand, train speeds have been reduced in certain instances in response to the growing concern in the rail industry that unit trains are causing accelerated wear and tear of tracks and roadbeds, particularly along curved trackage.

115. **Comment.** "A calculation from page 5-51 indicates that coal trains lose from 20-200 tons of coal per trains load. In the worst case, this says that one out of every 50 unit trains blows away. What are the effects of this emission?"

Commenter 118

Response. Estimates of wind blown coal dust (fugutive dust) range from 0.2 to 2.0 percent. A unit train carrying 10,000 tons may lose 20 to 200 tons of coal. This is a worst case estimate, because it assumes that coal is transported dry. An effective mitigation major would be to transport the coal wet and covered. This would reduce fugitive dust emissions to negligible amounts.

Fugitive coal dust would be dispersed along the train route and over a wide area. The impact of the coal particles include possible reduction in visibility, damage to surfaces of structures, injury to vegetation, and damage to human health. The severity of this damage and the toxicological and epidemiological effects of coal dust are a function of particle size, concentration, and composition.

116. **Comment.** "On page 5–87, it is stated that 'Because coal transportation systems are not labor intensive, employment growth to transport coal would not be as dramatic as for mining or use of coal.' This is opposite the findings of the Colstrip III and IV EIS. Which is correct?"

Commenter 121

Response. Relative to other phases of the coal cycle, coal transportation facilities require lower per-ton labor inputs and higher per-ton capital inputs. Accordingly, it is reasonable to characterize coal transport systems as capital intensive rather than labor intensive.

117. **Comment.** "Although the draft addresses the problems associated with hauling coal by truck or by train, it does not recognize the severe adverse effects on both state and county roads not just from an unaccustomed volume of commuter traffic but also from the hauling of heavy equipment to and from mine or facility sites. This stress and the construction of new or relocated roads can cause overwhelming highway and roadway expenses."

Commenter 121

Response. The text of the FES reflects this comment.

118. **Comment.** "The bulk of the discussion on transportation impacts dwells at length on the impacts on the railroad industry. However, discussion of impacts on people due to railroad transport of coal is so brief that the statement virtually ignores this major impact. The impacts of railroad/highway crossing blockage, community disruption, and financing mitigation measures warrant discussion in character with the rest of the text."

Commenter 122, 121

Response. The text of the FES has been modified to reflect the concerns indicated in the comment.

119. **Comment.** "In Chapter 5, Regional Impacts, Page 5–113, the environmental impacts resulting from the transportation of coal by rail, there should be some mention of rail-side ecosystems. An appropriate comment here could be taken from a report published by the Office of Technology Assessment, dated March 1978, entitled, 'Coal Slurry Pipelines.' On Page 117, 118 and 120 of this report there is a rather complete review of the disruption of biological communities from two modes of coal transportation systems. Copies of these pages have been attached."

Commenter 006

Response. The FES addresses the ecological impacts of rail transportation of coal in Section 5.3.5.

120. **Comment.** "On Page 5–116, the third paragraph under section 5.2.5.4, Coal Slurry Pipelines, the sentence which begins, 'While this quantity of water would be a small portion of available surface water, ... underlying the Madison Formation, the exporting of such a valuable resource has met with the opposition from Westerners,' we would suggest that the last part of this sentence read as follows, ' ... the exporting of such a valuable resource has met with opposition from some Westerners and is receiving growing support from others.' To support this suggested change, we have attached a copy of a letter to Sen. Dale Bumpers from Mr. Frank B. Odasz which includes a list of coal slurry pipeline proponents. This information is documented on Page 271 of hearings that were conducted on the Coal Pipeline Act on May 17, May 25, and June 19, 1978, before the Subcommittee on Public Lands and Resources (Publication No. 95–136.) To further support this addition, we have enclosed a copy of a list of Wyoming proponents of the coal slurry pipeline."

Commenter 006

Response. The FES text has been altered to indicate that the coal slurry pipeline issue receives mixed support and opposition from Westerners.

121. **Comment.** "On page 5–113, it is stated that funds are available from the 1978 Surface Transportation Act for rail-highway grade crossing improvements. It should be more specifically pointed out that this is a limited amount which is intended for use throughout the state. The needs at other locations throughout the state must also be recognized."

Response. It is understood that funds for rail-highway grade crossing improvements are not solely intended for rail lines hauling coal.

122. **Comment.** "Figure 5–3 shows no coal being moved by rail from the McKinley Mine to Texas or Arizona."

Commenters 019, 135

Response. Although these movements may have been occuring, they were not considered to be

of major volume. Figures 5.4 and 5.5 (1985 and 1990 interregional flows) should be consulted to obtain a graphical concept of how the total future coal productions will move.

123. **Comment.** "The major projected sources for unconventional natural gas are in the geopressurized zones of the Gulf Coast and the Rocky Mountain overthrust belt. Thus, such sources are perfectly situated to service the same region which will be receiving the bulk of Western coal (Figures 5–4, 5–5, show Texas, Western Interior and Other East (the Midwest) receiving the bulk of Western coal). There is also a good transportation network already in place. No mention is made of any of these facts."

Commenter 097

Response. Section 2.5 addresses trends in other sources of energy such as unconventional natural gas in the Gulf Coast and the Rocky Mountain states. It further states that this resource is considerable but the recovery technology has yet to be developed. Therefore, future development of unconventional natural gas may, at some future date, become a significant source of energy affecting the interregional demands of Western coal but not in the immediate future.

124. **Comment.** "The DES makes only passing reference to slurry pipelines because certain constraints on slurry transportation are unresolved. This avoidance of slurry pipeline issues is hardly justifiable in a presentation which undertakes to forecast such nebulous topics as coal demand and effects of coal demand in 1990. Slurry line proponents themselves represent that slurry line construction is a certainty in the early 1980's.

"In light of the serious environmental risks posed by slurry pipelines - especially the diversion of Wyoming's scarce water resource - careful treatment of these environmental impacts seems required."

Commenter 067

Response. Speculation as to the resolution of the major unresolved issues affecting future development of coal slurry pipelines is beyond the scope of this programmatic ES. The potential quantity of coal to be transported by slurry pipelines has been incorporated in estimation of potential environmental impacts. Environmental impact statements will be prepared prior to pipeline construction and operation. These impacts will be addressed quantitatively on a site-specific basis when the specific pipeline routes have been identified.

125. **Comment.** "The DES indicates that certain rail links may have shortfalls in capacity to haul future coal traffic. Table 5–62, Potentially Constrained Rail Links, page 5–110, specifically identifies two Burlington Northern routes which allegedly will be unable to handle expected traffic volumes. Because reference No. 77 was omitted from the resource list at the end of Chapter 5, we are unable to analyze the assumptions which lead to the 'capacity shortfall' conclusion. The DES does recognize on page 5–109 that the railroad industry has expressed willingness to expand line capacity to accommodate projected increases in coal traffic. Capacity on the Burlington Northern route east from Gillette to South Dakota border (through Clifton) is adequate for current traffic levels and additional track is planned for this segment in the near future. The second Burlington Northern route mentioned (from Frannie Junction to Cheyenne) is not on an existing or planned route for unit coal trains and, therefore, the expectation of a severe capacity shortfall is puzzling. A portion of this route from Orin Junction to Wheatland, Wyoming is a coal route for which improvements to increase capacity are also planned in the near future. In light of the railroad industry's expressed willingness and plans to expand capacity of rail lines to meet projected coal traffic, Table 5–62 has only marginal significance. It would be more accurate and informative to include in this table information indicating track capacity after projected improvements have been made."

Commenter 067

Response. Reference No. 77 was inadvertently shown as the source of the data presented in Table 5–62 (Table 5-82 of the FES); this reference is not germane to the table. The information shown is based on original analysis which is intended to identify potential railroad capacity constraints on anticipated coal flows rather than projected track capacities. Coal flow data, developed as described in Section H.2.3, were the primary input to the analysis. Centroids (cities) were selected for the already indentified coal producing and consuming areas and formed into origin-destination pairs appropriate to the coal flow data. The route between each O-D pair was

then selected on the bases of lease circuitry and roadbed quality. The routes selected do not necessarily reflect existing routes as they were predicted on the coal flow information. The capacity of each route was expressed in terms of trains per day (assumed to be 25 for single-track lines and 70 for double-track lines). The number of trains per day required for estimated non-coal traffic was deducted from capacity and the balance compared (on a gross ton-mile basis) to coal traffic requirements. The capacity shortfall on the five routes shown in FES Table 5–82 rests, therefore, on the assumed track capacity of 25 trains per day in each case and on the estimated coal flow over these routes. To the extent that track capacity is above or will be increased beyond this level by 1985 or that the coal flow is overstated, the indicated capacity shortfall would be mitigated.

126. **Comment.** "The DES purports to compare energy consumed by various modes of transportation in moving coal from production facilities to other locations on the coal cycle. See pages 5–116 and H–54. The estimations of operating energy expended by railroads and slurry pipelines are not only inaccurate but are completely out of proportion. The recent task report on coal slurry pipelines prepared by the Office of Technology Assessment predicts slurry pipeline operation would consume about 920 BTUs per net ton-mile versus only 400 BTUs for rail transportation of the same quantity. Office of Technology Assessment, 1978. A Technology Assessment of Coal Slurry Pipelines. Washington, D.C., Volume II, Part 2, page 205. Burlington Northern's own experience with unit coal train service indicates a figure slightly lower than 400 BTUs per ton-mile. The DES energy consumption rates of 670 BTU for rail carriers and 450 BTU for slurry pipelines are unsupportable."

Commenter 067

Response. The comment noted that Burlington Northern's own experience of energy consumption is 400 BTUs per ton-mile versus reported 670 Btus for rail carriers.

The 670 BTUs per ton-mile (Section 5.3.6 of the DES) were divided by 1.78 to give 376 BTUs per gross ton-mile. This closely agrees with Burlington Northern's statement. Also, on a gross ton-mile basis, pipelines consume more energy than railroads. How much more is argumentative.

It should be noted here that these numbers are subject to a number of varied interrelated influences, and they should be viewed as representative on a national basis rather than definitive.

Further information can be found in: "Committee on Interior and Insular Affairs, U.S. Senate, Conservation of Energy, A National Fuels and Energy policy study, serial #92–18, Washington, D.C., 1972 page 50.

127. **Comment.** "Again, in Section 5.2.5.1, the analysis of transportation impacts deliberately sets forth only the worst case situation in which the vast majority of coal is moved by railroads with a variety of resulting impacts. The Department should try to develop again a 'most likely' impact scenario because even where discussions are relatively brief and it is clearly stated that they are on the worst cases basis, a reader is likely to lose sight of that in attempting a detailed review of the bewildering amount of data contained in the Statement.

"The last paragraph on page 5–113 makes the incredible statement that it is possible to construct major new rail lines without prior authorization from the Federal government. In support of this statement is a footnote reference to a publication based solely on one section of the Interstate Commerce Act. We are aware of no major rail lines that have been constructed or that are proposed for construction which could avoid getting any authorization from the Federal government. Even in instances where rail lines have been built as spur lines by coal companies, the construction was the subject of at least an environmental analysis or an environmental impact statement because it was associated with one or more coal mine developments which in themselves required some Federal authorization. Therefore, the fears expressed in this part of the Statement would seem to be wholly unfounded and unnecessarily raise problems for new coal development in the West.

"As is noted in the closing sentence of this Section, such considerations have far-reaching social and political implications which can only be considered by Congress and not in an environmental impact statement on only one of a number of activities which will affect the population growth and result in environmental impacts in the West. This Section vividly portrays just a few of the many serious problems which would be created by

any end-use control system so that it is difficult to understand why the Department is expending any effort in further consideration of this option."

Commenter 066

Response. The mentioned article cites these instances where major rail extensions were or may be constructed without any prior approval of the Federal government. For example, a 19.2 mile line was constructed in 1972 by the Decker Coal Company to link its mine (with projected 1980 production of approximately 20 million tons) with The Burlinton Northern mainline at Sheridan, Wyoming. No detailed environmental analysis was conducted for this line. In addition, the article notes on page 185 that " ... the Burlington Northern recently prepared a prelimiary engineering report for the 43.7 mile line from The Big Sky Spur near Colstrip to Ashland, Wyoming. The railroad's preferred route does not enter The Crow or Cheyenne Reservations and avoids Bureau of Land Management properties. "Accordingly, no right-of-work permit ... would be required." If built by a coal company or if classified as a spur line, commission authorization would similarly not be required.

128. **Comment.** "The ES's assumption that coal transportation will not be a problem stands in stark contrast to statements of industry spokesmen. Burlington Northern Chairman Louis Menk has stated that his company, a leading transporter of coal, is 'critically short of cars and locomotives', and Randall Meyer, President of EXXON Co. USA, has stated that 'The limitation (on producing Western coal) is getting coal trains in and out of there'. Wall Street Journal, February 15, 1978, p. 31.

"Exacerbating this problem, of course, is the huge quantities of captial which will be required to build up the railroads' coal hauling capabilities to handle and move a six-fold increase in Western coal production over the time period 1976–1990. According to the ES, during that time period, coal movement by railroad will increase at an even faster rate: from 110 billion ton-miles in 1976 to 872 billion ton-miles in 1990 (p. 5–109). Will this staggering increase cause any financing or equipment problems? 'No', says the ES analysis of supply and demand levels; 'Yes', say other portions of the ES and the railroad industry itself (p. 5–109 to 113). The most conservative estimate in the ES is that the industry will require $17 billion just to make capital improvements for Western coal traffic alone (p. 5–113). This will not be an easy chore for an industry whose financial strength is called 'anemic' and which has a rate of return on equity investment of 2%."

Commenter 060

Response. The DES does not imply that there would be no financing, equipment, or other problems related to achieving coal production levels projected for 1985 and 1990. Rather, Section 5.1.2.1 assumes that the mentioned factors would not present insurmountable constraints to meeting the Nation's future coal demands. While the rail industry as a whole has a low rate of return, most of the major coal-haul railroads(particularlythose serving the Western coal fields) experienced rates of return considerably above the national average. For example, the five year average rates of return for the Union Pacific, Norfolk and Western, Chessie, and Burlington Northern Railroads were 6.0, 5.9, 4.8, and 4.3 percent, respectively (see Interstate Commerce Commission, 1977. Initial Paper of the Rail Services Planning Office in The Study of Rail Mergers and Consolidations. Washington, D.C.).

129. **Comment.** "The ES'S estimates of the capital needs of the railroad industry to expand Western capacity, however, pale beside those of the coal industry itself. A US Bureau of Mines study, for example, is quoted in the Wall Street Journal as estimating that even to reach 988 million tons per year by 1985 (approximately equal to the 'low scenario') would require a capital investment of $45.5 billion. It would also demand the training of 531,000 new miners. Wall Street Journal, September 26, 1977, p. 28. This is an incredibly difficult bill to fill in the next six years. No wonder, then, that the General Accounting Office concluded that doubling coal production to 1.2 billion tons by 1985 is impossible, and that reaching even one billion tons would be very difficult.

"Yet, the Draft ES assumes that achieving the higher of the two levels will entail no significant labor, capital, or equipment problems. It merely assumes these 'myriad problems' out of existence."

Commenter 060

Response. See response to comment 114., above.

130. **Comment.** "Page 5-115: There must be a discussion of the impacts of coal development in areas where there are no existing paved roads. The following statement points out the inadequacies of the Draft Environmental Statement in this regard:

" 'Perhaps the most important impact would be the perceived, rather than actual, impact of truck traffic on a local community-in terms of traffic volume, noise and vibrations, coal spillage and visual impacts".

"This irresponsible statement points out that whoever wrote this Draft Environmental Impact Statement has no perception of problems outside the scope of suburban life where this statement might have some validity.

"In the entire San Juan Basin, that area of the San Juan River Coal Region where most coal development will take place, there are two paved roads, neither of which comes near the areas to be developed. The impacts of traffic related to coal development in this area are tremendous and must be addressed."

Commenter 057

Response. The term "community" as used in the environmental statement is broadly construed to include rural as well as suburban areas. The need for paved roads in sparsely populated areas is but one component of local infrastructures which would be adversely impacted by accelerated coal development. Related fiscal impacts and tax lead time shortfalls are discussed in sections 5.2.4.4 and 5.2.4.5 of the DES.

131. **Comment.** "Inflated estimations of coal production from the Powder River Basin will cause a significant overstatement of impacts from coal transportation by rail carriers. Impacts attributed to rail operations in the Powder River Basin region are exaggerated throughout the DES and presumably are high for other regions as well. Track capacity, gaseous emissions from combustion of locomotive fuel and other impacts are dependent on coal volume transported and the system for transportation. All of the above factors appear to have been calculated based on a unit train consisting of 100 cars. In actuality, most Burlington Northern unit trains are and will be comprised of 110 cars, giving a train capacity of 11,000 tons. Ignoring for now differences in coal volume projections, the faulty assumption of a 100-car train leads to numerous erroneous conclusions, Track capacity, for example, is stated as the number of trains per day over a track segment before congestion occurs. Generally tonnage hauled is not considered. Thus, the amount of coal which could be transported over a given line segment per day would be greater in 110-car trains than in 100-car trains."

Commenter 067

Response. The use of 100-car, 10,000 ton capacity unit trains reflects a generally accepted national average for unit train movements. It is recognized that actual train configurations vary widely depending upon track grade and curvature, operating practices of individual railroads, the availability of in-service hopper cars and engines, and the volume of coal movements to utilities and other consumptive points.

While most Burlington Northern unit trains will consist of 110 cars, the average system-wide capacity would be somewhat less.

132. **Comment.** "P. 5–115, 5.2.5.3 - Highway Transportation. The following information was not given and should be if there are potential impacts:

a. Bridge weight restrictions.
b. Highway design capacities - volume at service level C.
c. Road bed construction.
d. Additional traffic generated by employees and families.
e. Noise generation.
f. Impacts on small towns where the main street is often a major Federal or State Highway."

Commenter 031

Response. The need for highway improvements and additions mentioned in Section 5.3.5.3 would depend in part on the impacts mentioned, particularly bridge weight restrictions, highway design capacities, and secondary traffic generation. Truck transport of coal greatly accelerates the deterioration of road surfaces, particularly on secondary and local coal haul routes. The actual extent of resulting environmental impacts cannot be determined at the programmatic level as they are dependent on localized road conditions and coal haulage volumes.

133. **Comment.** "Pages 5–59 thru 5–72 show tables of estimates of emissions of SO_2, particulates, and other pollutants for 1985 and 1990 under the several alternative plans as well as the

preferred program. These show increases for the western areas, in particular those in the Southwest. The Bureau of Land Management should ensure that the requirements of the Clean Air Act Amendments of 1977 are fulfilled and that the program is implemented in a manner that will not impair the air quality related values that are a highly significant component of the environment of units of the National Park System in this region."

Commenter 233

Response. The impact of coal leasing on regional air quality will be assessed as part of the regional lease sales environmental impact statements under the Secretary's preferred program. Lease sale schedules would be conducted to avoid violations of the Clean Air Act Amendments as a direct result of mining or due to mine-related developments. In conducting the regional lease sales analyses, the BLM will be especially cautious about mine-related impacts on the air quality of National Parks and other Federal land management systems. Where such impacts are forecast, the participation of the affected land management agency would be sought.

134. **Comment.** "(Page 5–59) The discussion with respect PSD in the DES is related totally to power plants. The FES should address EPA's policy with respect to PSD and mining(i.e., EPA's treatment of fugitive dust). OSM's treatment of the fugitive dust issue should also be discussed."

Commenter 091

Response. The PSD discussion on page 5–59 in the DES gave one example that related to a power plant and was *not* related totally to power plants. The PSD class designations (Class I, II, and III) presently establish maximum allowable air quality degradation in terms of allowable incremental increases in sulfur dioxide and particulates. (PSD regulations for other criteria pollutants are expected later this year). The PSD system is not directed toward a specific activity or activity category but rather toward the air quality of the area, regardless of the source of potential pollutants in the area.

The document has been revised to include a discussion of the contribution of OSM's fugitive-dust control regulations to air quality.

SUBALTERNATIVES

1. **Comment.** "Section 5.4.7 discusses the apparent preferred alternative definition for 'maximum economic recovery' which requires that recovery be based on the mining of all collectively mineable seams in a property. While it is advantageous that a coal company have the option to mine all seams within one property rather than leasing separate seams to different companies, such an election should be based, as reflected in the third alternative discussed in this Section, on sound engineering practices which can be readily adapted to changing mining technology and economics. Any profit-making company such as a coal company which invests huge amounts of capital in its projects cannot realistically be expected to act to reduce the return on that investment by failing to mine the maximum amount of coal from each seam which can be safely and efficiently mined."

Commenter 066

Response. The Department recognizes that carrying out the Congress' directive to ensure that all mining plans for Federal leases achieve "maximum economic recovery" of the coal in the lease is one of the more difficult problems it faces. The goal of the standard is laudable: to make sure that coal is not unnecessarily left in the ground. Unfortunately, the solution is not as simple as the commenter suggests. First, companies do not have the incentive to mine all reasonably available coal—they have only the incentive to mine the coal that will yield the highest profit. Second, not all companies are capable of consistently maximizing their own return. Resistance to innovation is one factor, for example, that may limit a company from maximizing its return. The underground mining portion of the coal industry in the United States has been slow to adopt longwall mining techniques even though they are widely accepted in other countries. The failure to adopt this technique may be due to a variety of factors, but whatever the reason, the principle effect is that a lot of coal that might otherwise be recovered is permanently left in the ground. If the standard could be limited to situations where there will be major differences in total recovery it might be of universal benefit. The problem with this solution is that it appears that Congress was concerned with more subtle situations as well and intended the Department to oversee narrow gradations of recovery as well as large ones. As the text notes,

the major drawbacks of this approach are that it begins to involve the Department heavily in reviewing day-to-day economic decisions of a given company.

2. **Comment.** "5.4.2: In this section on requiring underground mining, references to the economic aspects of mining should be worked into the discussion."

Commenter 079

Response. The section does refer to economic aspects, particularly with a reference to the $8–15 per ton cost difference between surface and underground mining. Additional language has been inserted to explain that the expected decline of production in some regions as a result of this policy stems almost entirely from economic considerations.

3. **Comment.** *"5.4.2 Require Underground Mining*

"The summary of this alternative is at best, superficial and really lacks thoroughness. Such an alternative makes so little sense that it would be best to discard it in the final analysis. Fearing this will not be the case, we submit some additional thoughts.

"1. Some of the best reserves (quality) may be too shallow to mine by underground methods.

"2. It is assumed in the conclusion that safety can be assured by Federal regulations in underground mines to insure that their fatality/injury rate is similar to that of a surface mine. It is also assumed in the conclusion that Federal regulations concerning surface mine regulations will not have a similar positive effect on reclamation.

"3. By requiring only underground mining, the presently developed surface mining operations may wither away as fee reserves are depleted or surface mining becomes uneconomical because logical surface mining units are no longer available without the combination of fee and federal leases. This could cause serious social costs to surface mine employees whose services are no longer needed. It cannot be assumed that they will become underground miners. It cannot be assumed that a significant number will be absorbed into other jobs within the community.

"4. It is recognized that underground mining requires significantly more manpower than surface mining. One fact that is not discussed, is the environmental damage that would be caused by the additional urbanization required to house and serve this larger number of miners. This environmental disturbance would be of a permanent nature. Environmental damage from surface mines is recognized and emphasized to the extent that it would be assumed that no reclamation was, or will be occurring. This is not the case as a number of mines have conducted good reclamation in recent years. The Federal surface mine law of 1977 requires thorough reclamation, controls the introduction of sediment into streams and insures that the area is replaced to its approximately original contour. Environmental damage caused by a surface mining operation is transitory; environmental damage caused by urbanization is permanent.

"5. Wishing away the cost differentials like those found between underground mining and surface mining, can only happen in the Federal government and sewing circles."

Commenter 152

Response. The text has been revised in response to the comment.

4. **Comment.** "Section 5.4.5 discusses diligence and continuous operation requirements. This section opens with a brief statement as to the advantages for strictly applying such requirements. It should be noted that the imposition of end-use controls would significantly decrease if not eliminate most of these advantages.

"Also in this Section, the Department continues to stress the fact that many existing leases are not producing. Although it is not disputed that some of these leases have been and continue to be held for speculation, it should also be noted that it was only within the last five or six years that there was any real market incentive for the development of western coal in general. Furthermore, as has already been noted in the Statement many of these leases exist in units too small for economic development or in areas where development would be prohibited or unduly costly because of environmental considerations. To this list of constraints beyond the control of the lessees of non-producing leases must be added the fact that in the past five or six years 'the rules of the game' for federal coal leasing and the stipulations under which mining could be conducted, if at all, have been changing constantly and significantly. In view of these facts

and the statements made at the top of the second column on page 5-133 concerning the long lead time to the opening of mines even under the best of conditions, it can be seen that many of the leases which were not developed are and perhaps will remain so because of circumstances beyond the control of either the lessee and/or the Department.

"Also on page 5-133, is a discussion of alternatives to the present diligent development and continuous operation requirements. It is puzzling why the Department of the Interior is concerning itself with such alternatives since it acknowledges at the beginning of this discussion that the authority to adopt any such alternatives is totally the responsibility of the Department of Energy."

Commenter 066

Response. The discussion of diligence is included in the programmatic statement first because factors affecting whether existing leases will be developed will, over the next five to 10 years, affect whether and to what extent the Department should lease additional coal reserves. Evaluation of existing lease production potential is part of the process required by the memorandum of understanding between DOE and Interior and is part of the regional production target process in the preferred program. The discussion will also be of some use to the DOE should it decide to modify the existing regulatory requirements for new leases.

As to the point that leases are not being developed because of "circumstances beyond the control of either the lessee or the Department", the Mineral Leasing Act does not contemplate that coal leases can be held indefinitely without production. Under the Act, a lessee is required to make prompt, active efforts to achieve production. Failing that, the lease should be returned to the government. Finally, the Department does not agree that government delays or changes in rules have substantially impeded western coal leases.

5. **Comment.** "It is necessary that both biological and social impacts be minimized in the process of siting new mining activities in Montana. The current experimental nature of mitigation of mining impacts in the undisturbed rural areas of the West indicates that concentration of mining activities and their effects is the only feasible strategy for reducing uncontrollable, areawide disruption. The draft Federal Coal Management E.S. (DES) briefly discusses this option in Section 5.4.4. This strategy for Western coal mine siting is also covered in more detail in a paper presented to the Conference on Energy and the Public Lands, III, at the University of Utah, August 18, 1978, which should be studied by the Dept. of Interior.

"In Section 5.4.4, 'Concentrating Federal Leases,' several problems are pointed out regarding this strategy, in particular, the concentration of air and water pollution. It would be beneficial to concentrate these impacts so that a more economical and effective program of monitoring and abatement could be utilized. The construction of one or only a few high quality water treatment facilities, for use by several companies, would be less expensive and more effective in protecting water quality. Similarly, the joint use of dust abatement equipment and materials would be more cost effective and give better results. The current situation in Montana involves serious violations of TSP regulations at every mining site where monitoring networks are sufficient to adequately measure air quality. The Montana air quality regulatory process is currently inadequate (with financial support from the federal government) and will be spread more thinly and be even less effective with further dispersal of mining activities. Concentration of air pollution sources is the only way the regulatory agencies will catch up with the problems of monitoring and equitable enforcement, given the existing monetary constraints.

"Federal Coal Leasing Policy Guidelines: 'Where', 'When', and "How" Curry, Robert R. and Charles van Hook. Conference on Energy and the Public Lands, III. Univ. of Utah, Park City, Utah. Aug. 18, 1978."

Commenter 071

Response. The text has been modified to show the advantages of concentration to regulatory agencies and overall compliance with environmental laws. The preferred program seeks to handle problems like this as part of the regional tract ranking process which will help determine tracts or patterns of development can best meet the nation's energy needs with minimum disruption in each region.

6. **Comment.** "Section 5.4.8 discusses unsuitability criteria development. Although it is not expressly stated in this Section, it is assumed that

the task force field studies and reports applying the draft criteria would be available to the public. These field tests as described in the third full paragraph on page 5-141 were applied in sections of Montana and Wyoming to indicate an exclusion of one-third to one-half of the available federal coal resources. This result is all the more incredible and unrealistic when viewed with the fact that such exclusion did not apply all twenty-four unsuitability criteria even though some of the criteria have since been modified to permit more leasing. As discussed above, it would appear that the criteria, particularly that related to endangered species and wildlife habitat, is being applied most rigidly and without exceptions or compromises which have been so often experienced in past development impacts on such aspects of the environment. It is hoped that the Department will consider a wholesale review and revision of the unsuitability criteria to minimize the amount of coal which would be excluded while meeting the clear mandates of relevant legislation. In the final statement, the Department should include an analysis of the same areas to which the draft unsuitability criteria were applied so that the industry and public in general can have a clear concept of just how and to what extent criteria in this final proposed form would exclude federal coal resources from development."

Commenter 066

Response. The Department shares the concern of this comment that land not be excluded from leasing unless mining would have a harmful effect on the resource that a criteria is intended to protect. This is particularly true with respect to wildlife concerns where filed experience shows that some wildlife species can co-exist with coal mining operations if the operations are conducted with a reasonable degree of sensitivity to the wildlife. The Department's proposed standards are supposed to be sensitive to the distinction. The results of the new field tests of these standards were not available in time to be included in this final statement. We expect to publish a notice of availability of the results of the field tests on or about May 15, 1979.

7. **Comment.** "1. On page 5–131 under the heading of End Use Considerations, the text reads, 'To encourage development of new technology .... a lease stipulation could require the coal in the lease to be developed by a particular mining method (such as in-situ gasification) to protect lands that offer high potential for a new technology.' I believe there is a need for encouraging development of new coal technologies and that lease terms can be an effective mechanism for advancing these new technologies. Other than stipulating the end use to which a coal lease can be put as exemplified in the above quotation, I suggest that certain lease terms as mandated by the Federal Coal Leasing Amendments Act of 1976 be modified for lessees and preference right lease applicants whose mining method is a new technology. Modifications recommended to encourage new technologies are:

"—Extension to 15 years the period for achieving diligent development. Retention of the provision allowing the Secretary to grant one five year extension to the period for achieving diligent development because of time needed to complete development of advanced technology.

"—Provision for advance royalties to be paid for 15 years.

"—Extension of the total 40 year production time to 50 years where reserves are large enough to warrant such an extension.

"Since the Department of Energy now has the authority to revise diligent development and continuous operation regulations and has established production goal levels for synthetic fuels produced by coal gasification, it seems appropriate that the Leasing Liaison Committee establish lease terms tailored to provide incentives for new coal technologies."

Commenter 112

Response. All three of these points would require new legislation to carry them out since the Mineral Leasing Act as amended by the Federal Coal Leasing Amendments Act mandates 10-year diligence requirements, allows advance royalties for only 10 years, and requires production of all reserves from mining plans in 40 years. As part of the decision making process, the Department may recommend legislative changes. The particular proposal raised by the comment is evaluated in section 5.4.5.

8. **Comment.** "Section 5.4.8 and Tables 5–72 and 5–73 discuss the unsuitability criteria utilized by the coal task force in the summary of 1978. The proposed unsuitability criteria which were published in the December 8, 1978 Federal Register

(43 Fed. Reg. 57668–57670) differ substantially from the unsuitability criteria discussed in the DEIS. The body of the FEIS should reflect the new proposed criteria and should contain sufficient information to permit a reader of the FEIS to know what areas of federal coal lands will be deemed unsuitable under each criterion and what amounts of coal will be excluded from consideration for development by utilization of each criterion."

Commenter 090

Response. Section 5.4.8 and Tables 5–72 and 5–73 differ from the actual proposed unsuitability criteria as of December 8, 1978, because the field tested criteria were scrutinized and modified in certain seemingly appropriate instances prior to December 8, 1978. The FES text of Chapter 3 and Appendix A (Proposed Regulations) contain detailed information on unsuitability criteria.

9. **Comment.** "Para. 5.4.9 implies EMARS II was boycotted by all environmental groups. This was not the case and should be so stated. For the BLM's Chaco Planning Unit alone, two environmental groups made nominations."

Commenters 019 and 135

Response. Section 5.4.9 states that the nominations process was boycotted by a "large number" of environmental groups rather than "all" environmental groups.

MITIGATION

1. **Comment.** "The DES fails to substantively address the problems of socio-economic impacts of leasing federal coal, and the preferred program avoids establishing any guidelines or specific requirements to include these effects in decision-making.

"The DES shows a complete misconception of the nature of the disruption in statements like: 'While the change offers long-term opportunities for the communities in question, short-term distress has too often been the more visible result.' (p. 6–4) The long-term benefits of extraction of a nonrenewable resource, particularly by strip mining in an area where reclamation is dubious, will very likely be the 'bust' of unemployment and poverty.

"The DES goes so far as to cheerfully suggest a public relations effort (top of p. 6–5), in coordination with the few who enjoy an economic boom with industrialization, as a mitigation measure.

"Since much of the federal coal lies in rural, agricultural areas, the introduction of coal mining will radically alter the character and economy of the communities. State and local governments, *and the public,* should be involved in determining levels of leasing. Guidelines or standards on levels of social and economic impacts that can be borne in an area should be developed."

Commenter 061

Response. The purpose of the FES is to analyze the environmental impacts of the preferred program and its alternatives. Among these impacts are the socio-economic impacts. The socio-economic findings in Chapter 5 demonstrate the above-described alteration of the character and economy of the communities (short-term and long-term), as well as benefits and detriments. The state and local governmental inputs to program decisions which drive these impacts are addressed in Chapter 3 of the FES.

2. **Comment.** "While we appreciate the symbolic attempt to mitigate the adverse impacts of the proposed action, it is obvious that this section is sorely lacking. The impacts itemized in Chapter Five are on quite a different and removed level of specificity compared to the mitigating measures. If the impact statement is to be consistent, it must speak in the same terms and planes in all chapters. Chapter Six attempts to conceptually mitigate the impacts, but does nothing to practically deal with the problems."

Commenter 118

Response. Chapter 6 addresses the mitigatory measures of a program which already incorporates environmental mitigatory measures, such as the unsuitability criteria. Chapter 5 addresses the environmental impacts of the total program, including these mitigatory measures. It is therefore not practical to address mitigation in the same terms as does Chapter 5.

3. **Comment.** "6.3.2 - Socioeconomic Impact Mitigation "The statement fails to adequately point out the full range of assistance available to impacted communities. Of particular consequence are the changes in the formula for distributing federal royalty payments; increases in state severance taxes, impact aid under the Federal Land Policy and Management Act (FLPMA), and

payments in-lieu-ot-taxes. Several, but not all, of the above programs are mentioned (6.3.2.8), but there is no quantification of the assistance available, or potentially available, to communities impacted by federal coal development. We believe the data will show a significant amount of financial aid is readily available which could reduce the socioeconomic impacts involved. In any case, further information should be provided."

Commenter 069

Response. An estimation of the quantity of financial assistance available, or potentially available, to communities impacted by Federal coal development is an economic issue as opposed to an environmental impact and as such is beyond the scope of the FES.

4. **Comment.** "The first introductory paragraph on page 6–1 contains the statement that 'The impact analysis in the previous chapter (Chapter Five) does not include those mitigating measures required by law or regulation' (emphasis added). As written, this is inconsistent with statements in Chapter Five, and we assume that a typographical error has been made. We believe the word 'not' in the above sentence should be deleted."

Commenter 069

Response. Agreed. The FES contains the suggested modification.

5. **Comment.** "On page 6–5 in the first column nine principal factors are listed which are to be considered in evaluating any impact of the proposed decisions discussed in this Statement. One of those factors is labeled 'cost internalization' and refers to the extent to which costs of all adverse impacts can be borne by the producing company or passed through to energy consumers.

"This statement perpetuates the popular myth that large corporations should be made to bear the brunt of costs which would be completely absorbed by them. In fact these costs simply add to the price of the coal or the product produced by the coal such as electricity and so all of these costs can be expected to ultimately be passed through to the energy-consuming public. This should be made clear in the final statement so that members of the public are not eager to adopt or support provisions which would unrealistically increase the price of the coal on the mistaken belief that in so doing their individual cost of energy consumption or of coping with the environmental impacts of coal development are reduced. It is true that costs may be shifted into the operator's internal cost structure, so that such costs might be hidden from the public but to suggest that doing so 'relieves' the consumer from these costs is simply not true."

Commenter 066

Response. Cost internalization (the extent to which the costs of addressing adverse impacts resulting from energy development are borne by the producing company or passed through in energy product processes to energy consumers) is presented as one of nine factors which merit consideration during the evaluating of impacts of proposed decisions. It is in no way intended to imply that industry, or for that matter consumers, should be made to bear any cost whatsoever.

6. **Comment.** "Page 6–3: "The statement is made here that the changes brought about by coal development will bring about long-term opportunities for impacted communities. In many areas the changes will actually spawn ghost towns and the eradication of traditional lifesytles. These end results should be discussed in detail in the final Environmental Statement."

Commenter 057

Response. The socio-economic analysis in Chapter 5 (Section 5.3.4.1) contains an impact analysis of population changes.

7. **Comment.** "Our principal concern in development of the coal resources of the Colorado River Basin is in regard to the possible production and disposal of saline drainage waters resulting from the operation of the mines and coal-using facilities. To minimize deleterious impacts, the mines and coal-using facilities should operate in accordance with the policy, adopted by the Colorado River Basin Salinity Control Forum and the states of the Colorado River Basin, of no-salt n-returns in industrial discharges, wherever practicable."

Commenter 113

Response. All coal development operations are required to be conducted within the confines of all local, state, and Federal legislation. We assume these funds will be applied in the areas of greatest need.

8. **Comment.** "Although the statement carefully explains the Department's limited role in mitigation of socio-economic impacts, we fail to

find a thoughtful statement of what the Department can do. Let me be more specific. The statement might offer comment on what kind of a mitigation program could work, even if new legislation or modified budget requests are required. The statement could describe what assistance could be forthcoming to the states and local communities under the loan provisions of the Federal Policy Land Management Act. The statement could review the current involvement and coordination, or lack thereof, of other federal agencies with the Department of Interior, and what might be done to improve joint mitigation efforts. The issues of phasing of coal development and stipulations in leases to mitigate impacts–two critical tools– are not adequately addressed. Four pages devoted to mitigation of socio-economic impacts in the statement gives the appearance of an afterthought to an otherwise comprehensive statement. For the western states, socio-economic considerations are at the forefront of our concerns. The mitigation of these impacts must be realistically and thoughtfully addressed in the final EIS."

Commenter 155

Response. The Department can best mitigate socio-economic impacts on local communities by coordinating their actions with local communities and states. This kind of cooperation would prevent most of the "surprises" that have occurred in some rapidly growing areas. The Department believes it is the responsibility of state and local governments to plan for and provide the public services and facilities needed to meet the demands of a growing population. The state and local governments have the taxing authorities and land-use planning and control authorities that makes them the best qualified to meet these public needs. Front-end costs are a problem but they can be met by state governments; federal government assistance is available through a number of programs.

9. **Comment.** "Page 3–20: "Section 522 of the Surface Mining Control and Reclamation Act sets out certain standards for the protection of the environment. One of the standards set out is that the protection of all aquifers be provided for.

"In the San Juan River Coal Region, especially in the San Juan Basin where most of the coal activity of the Region will take place, coal development will probably depend exclusively on water from the existing aquifer. However, no discussion of how the aquifer will be protected is included in this section. Since aquifers provide the only water supply for much of this region, discussion of mitigation measures is imperative."

Commenter 057

Response. Site-specific issues such as this must be addressed at the Land Use Planning step, the EIS on any lease sales, and the mining and reclamation plan. This issue, as important as it is, is beyond the scope of the Programmatic EIS.

10. **Comment.**

"On page 6–3, it is stated that 'The Secretary has also indicated that the Department should be responsible for determining, with reasonable certainty, that a specific tract can be developed without severe or permanent harm to the environment . . .'

"This obviously precludes development of coal leases in the Northern Powder River and Fort Union Coal Basins, as well as coal formations in other semiarid and arid areas, until the success of existing reclamation attempts has been thoroughly evaluated.

"It is also stated that EMRIA 'would provide site-specific reclamation data for use at the several decision points in the preferred program. . .' From whom would this data be obtained and which points in the decision-making process are being referred to?"

Commenter 071

Response. The success so far of reclamation in the Powder River Basin and Fort Union Basin indicates surface mining can be carried out in those areas; however, some areas cannot be mined under present standards. All proposed mining will be reviewed on a site-by-site basis either by the state or OSM for an adequate reclamation plan.

The scope of the EMRIA program is presently under review, however, basic data generated by EMRIA would be used as input to tract site-specific analyses for ranking and selection purposes. EMRIA would also input to the inventory generated at the beginning of land use planning and possibly to the review of the mining and reclamation plan submitted by the coal developer.

11. **Comment.** *"Chapter 6-Mitigation of Major Adverse Impacts of a Federal Coal Management Program*

"Opportunities for mitigation should be provided on a site-specific basis. We question that the

regional EIS approach will accomplish this objective. The preferred program should clearly describe its links to the process called for in SMCRA.

"A mitigative or compensatory measure not mentioned in this comment would be to provide habitat improvement concurrent with or preceding development of a coal mine in adjacent areas. This could provide habitat sufficient to sustain displaced animals in some instances and minimize the losses to wildlife for the thirty-to-thirty-plus year project life and until reclamation can be accomplished. This would be far preferable to an approach of using the unsuitability criteria as a means to exclude areas from any development, before the lands have been examined in detail for these kinds of possibilities."

Commenter 093

Response The unsuitability criteria do allow the local land manager to consider mitigation on a site-specific basis where appropriate; for example, the state resident wildlife criteria (o) does say that a lease may be issued where complete mitigation is possible or where the species being protected will not be adversely affected by all or certain methods of mining activity. The mitigation technique mentioned of providing enhanced habitat near a mine site to handle displaced populations for the life of the mine would be appropriate, especially if coupled with reclamation of some of the lands to wildlife habitat. The state resident wildlife criterion is not focused on general wildlife conservation, but rather preservation of high-interest populations from extinction or reduction to a critical level within an area. Wildlife conservation is expected to be sought most often through the use of threshold procedures by the local land manager.

12. **Comment.** "There are operations now in the state that are at an elevation of approximately nine thousand feet, and that's quite near the surface in the area of these operations.

"Considerable volumes of water are being interfered with in this operation, and the water is very vital to the forest production, which takes place in practically all of our state in these elevations.

"Not only is this *high elevation water important from the standpoint of community and irrigation uses downstream where* sufficient volume is available, but it's almost a must in the utilization of the forage resources in our high forest ranges, so I would like to see something done more than has been done to give some consideration to the surface owner."

Commenter 128

Response. Qualifying surface owners are given an absolute veto under the law over surface mining, but other surface owners whose lands overlie Federal coal deposits that will be mined using underground methods still are protected under the law against damages from mining activity. Further safeguards, in the form of withholding certain lands from consideration for leasing or of lease stipulations, will result from the land use planning and activity planning processes under the preferred program. The objective of the multiple use planning process is to preserve the long-term use of renewable resources on Federal lands. An owner of water rights is protected by state allocation laws and Federal/state water quality laws. Special provisions to protect ground water against the adverse effects of mining are included in the Surface Mining Control and Reclamation Act.

13. **Comment.** "Moreover, by incorporating into the preferred program at the pre-lease stage *extensive provisions relating to environmental protection,* the Department appears to be ignoring the effect of the Surface Mining Control and Reclamation Act Act of 1977 (which is not even included in Table 1–5 listing statutes affecting coal leasing). As a result, it would require many critical environmental judgments at the pre-lease stage, whereas such determinations cannot realistically be made until mine plans have been formulated.

"The effect is to exclude other sources of information and expertise and to rely instead primarily on government with respect to such critical issues as the determination of which lands may be appropriate for mining and with respect to the value of coal production as contrasted to other land uses in the multiple-use resource management tradeoff decision process. We believe this goes so far beyond the objective of environmental protection as to jeopardize the achievement of the production goals."

Commenter 087

Response. The Secretary has decided that the Department should only offer for lease lands for which it is reasonably certain mining plans can be approved. By selecting this policy, the Secretary is

offering coal companies a fairly high degree of assurance that they will not be put in the position of leasing lands only to find that they cannot mine them because of environmental considerations. Early concern for the provisions of SMCRA also ensures the Nation of a more certain flow of coal from the Federal leases and increases management flexibility. The preferred program envisions a large role for industry. In fact, the preferred program will not work without the participation of industry.

14. **Comment:** "(Page 5–26): With regard to discussions of impacts resulting from the various alternatives, the DES should clearly delineate impacts resulting from more coal mining and impacts from coal mining and coal conservation.

Commenter 091

Response:

As indicated in the comment, it is desirable to quantify impacts where possible. It is not possible in a programmatic impact statement to quantify impacts on soils, minerals, geology, and topography without being site-specific. When the tracts to be leased have been identified, then these impacts can be addressed quantitatively. This will occur in the regional lease sale environmental impact statements."

15. **Comment.** "On page 6–3, the statements in the second paragraph of the second column suggest all environmental stipulations to be attached to a particular lease and mining plan would be determined prior to the lease sale. Earlier descriptions of the lease sale and mining plan approval process indicated that at both levels the *Department would anticipate attaching special stipulations although most of the stipulations would occur prior to lease sale as is only fair to the lease bidders.* This inconsistency should be clarified in the final impact statement."

Commenter 066

Response. Not all stipulations can be developed prior to lease sale; however, the Department expects the bidder to be able to determine the costs of meeting stipulations if he is familar with SMCRA regulations, typical mining reclamation plans for the area, and pre-lease sale stipulations.

16. **Comment.** "The focus of our review involved Chapter 6, Mitigation of Major Adverse Impacts of a Federal Coal Management Program.

"Our primary concern has been the need to obtain direct federal financial assistance for planning as the State of Wyoming has deemed this activity ineligible for tapping Wyoming's share of mineral leasing royalties under Section 35 of the Mineral Leasing Act of 1920, as amended by Section 317(a) of the Federal Land Policy and Management Act of 1976.

"The Sweetwater County Planning and Zoning Commission, therefore, *recommends re-consideration* of the Department of Interior's 'inability' *to provide direct financial assistance to the planning and management functions of local and areawide agencies.* We are one agency of local government who has experienced energy and mineral impact. We contend that federal coal leasing policies cannot totally *abdicate* responsibilities on the distribution of these funds by State government."

Commenter 018

Response. As pointed out in Chapter 6, reduction of financial burdens on interest affected by leasing are anticipated as a result of the emphasis on early application of protective and mitigative measures. The preferred program and several alternatives are constructed to assure state, local, and Federal participation beginning in these early phases and continuing throughout the leasing process. As indicated in Chapter 6, financial assistance is beyond the Department's direct jurisdication; however, some Federal assistance for planning and management possibly is available under section 601 of the Powerplant and Industrial Fuels Use Act of 1978 to be implemented by the Secretary of Agriculture.

17. **Comment.** "We assume that the wide effects of air and water degradation that might accompany coal development are being addressed, yet the draft ES says little about how impacts to these resources will be avoided or minimized. Degradation of air and water resources is equally as important as impacts resulting in direct losses of fish and wildlife habitat."

Commenter. 287

Response. The program itself is geared toward managing Federal coal in an environmentally sound manner. Thus, because many of the program's elements are environmental mitigating measures (i.e. the unsuitability criteria and land use planning), the chapter on mitigation is limited and appears to be relatively small. It should be

noted that in addition to be mitagatory aspects of the program, air and water resources are protected by Federal, state, and local environmental statutes. For further information on relevant state statutes, refer to Appendix I.

18. **Comment.** "To our knowledge, there are no guidelines by which conflicts between oil and gas and coal production can be controlled or mitigated. Conversations with industry and governmental agencies have indicated that the two activities can occur on the same ground, but that protection of the oil and gas well(s) and pipelines would be required. It is the general opinion that leaving coal barriers or pillars to protect the wells and pipelines is perhaps the proper solution. If our information is correct, it would require leaving a coal pillar 2,000 feet in diameter to protect an oil or gas well where the coal is 1,000 feet below ground surface. This is assuming an angle of draw for subsidence of 45 degrees. Using an average coal thickness of 10 feet, this would result in the leaving of about 1,000,000 tons of coal for each well. A like amount would also be left for protection of each 2,000 feet of pipeline. This generates the following questions:

1. Are supporting coal pillars a proven method for the protection of oil and gas wells and pipelines?
2. Is this an acceptable method?
3. Who would be responsible should damage to an oil or gas well occur from the effects of coal mining?
4. Who would be responsible for the coal resources loss? For the coal value lost?
5. Would the coal company be given other coal to compensate for that lost?"

Commenter 282

Response. In the Mining Regulations, these issues are addressed under parts 211.11 and 211.21 which refer to mine plan and oil and gas/ coal management by the USFS Area Mining Supervisor and the Area O&G Supervisors

Coal pillars are an approved method, and are an acceptable method.

No damage should occur but if it did and the company should be found to have been negligent, then the coal company would be responsible. The USFS and MSHA would probably also be called on to account for such a problem. There would be no loss if the well was already in place and a known effect on the mining plant, ie., the coal was known not to be recoverable.

19. **Comment.** "A mitigative or compensatory measure not mentioned in this document would be to provide habitat improvement concurrent with or preceding development of a coal mine in adjacent areas. This could provide habitat sufficient to sustain displaced animals in some instances and minimize the losses to wildlife for the thirty- to forty-plus-year project life and until reclamation can be accomplished."

Commenter 266

Response. Where it is feasible, providing enhanced habitat for displaced animals is a sound mitigative strategy. Such a strategy is not always possible, however, since many species require a definite amount of territory, and this spatial requirement varies only slightly with the quality of the habitat available. This form of mitigation could be recommended as a result of general land use planning, site profile analyses, or mine plan development by the lessee.

LONG-TERM IMPACTS

1. **Comment.** "Table 7–1. Production figures given again conflict with those in the Star Lake-Bisti Regional EIS."

Commenters 019, 135

Response. The geographic boundaries and consequently the data bases differ for the Star Lake-Bisti Regional ES and this FES.

2. **Comment.** "The second flaw is the substance of the impact analysis. It is misleading, contradictory, erroneous and based on false assumptions. One such assumption is that all "mitigating measures required by law or regulation" are 'in operation.' (p. 7–1) Using reclamation as an example, this assumes that all coal mines can and will reclaim to the standards of the federal act. The long history of poor reclamation enforcement in this country and the short record of the Office of Surface Mining's efforts do not support the rosy optimism implied in that assumption."

Commenter 154

Response. While the Department of the Interior intends to fully implement statutory responsibilities in mitigating mining impacts, the point of Chapter7 is to realistically recognize those impacts which may be unavoidable. The program

described in the Environmental Statement is designed to assure, in conjuction with OSM's efforts, that only coal lands that are reclaimable will be mined and that all lands mined will be reclaimed.

3. **Comment.** "TDWR believes that the programmatic water resources impact analysis on pages 7–1 and 7–2 should include the following points:

a. The consumptive use of water resources impact analysis induced energy - related or industrial activities (e.g., "mine-mouth" steam electric generating plants) may further degrade water quality in certain streams and rivers by increasing dissolved solids concentrations and by reducing the assimilative capacity for other pollutants as a consequence of reduced streamflows.

b. Recent Federal regulations mandating the use of sulfur removal techniques on all new coal-fired power plants will substantially increase both water consumption and the amount of sulfur-bearing sludge that must be disposed.

c. The cumulative effect of Federal regulations which involve increased water demands and consumptive water use in energy-related activities, is cause for concern in water-short areas such as certain portions of the Texas Coal Region, as the national coal production and conversion programs are escalated. TDWR believes that the feasibility of mitigative actions should be considered with respect to federal regulations which do not provide the necessary engineering flexibility to adapt energy-related activities to local, geologic, climatic, and hydrologic conditions. For example, the revised national standards for thermal discharges from electric power plants do not appear to provide the maximum; reasonable latitude for engineering flexibility in the design of cooling systems. This flexibility would permit the optimum selection and use of cooling systems (i.e., wet cooling towers, single-purpose cooling reservoirs, once-through cooling on multiple-purpose reservoirs, streams, or estuaries, and dry cooling systems, etc.) which would provide the most desirable balance between water conservation (including minimum water consumption) and environmental protection."

Commenter 056

Response. The FES (Section 7.1.1.5) contains the modification suggested in point a. Points b and c however, are not addressed because the effects of recent Federal legislation are not the subject of this statement.

4. **Comment.** "Section 7.1.1.1 states that topographic features would be adversely altered by construction and mining. There exists considerable potential for upgrading the land surface to higher beneficial configuration after mining is completed. The draft should include discussion of such possibilities."

Commenter 106

Response. The purpose of the FES is to assess the environmental impacts of the preferred program and the alternatives. Regardless of the ultimate programmatic decision of the Department, coal companies would be required to comply with SMCRA, as well as any other regional reclamation laws. The environmental impact analysis is thus confined to these requirements, and any further analysis is beyond the scope of this FES.

5. **Comment.** "Portions of chapter 7 discuss the fact that reclamation is by no means an assured thing in many areas of the arid west. Given this uncertainty, it is difficult to put much faith in table 7–5 where estimates of wildlife populations that could be supported on reclaimed lands are made."

Commenter 121

Response. Section 7.3.4 has been revised to indicate that the wildlife populations which could be supported by reclaimed lands are a direct function of land in reclamation at any given time. Table 7–5 has been eliminated since it is no longer considered necessary.

6. **Comment.** "Tables 7.3 and 7.4 are also very misleading. They seem to indicate that reclamation will reestablish "forest" in the Powder River and Fort Union regions. It should be pointed out that to date very little success has been noted in attempts to reestablish ponderosa pine in these regions."

Commenter 121

Response. Tables 7.3 and 7.4 have been deleted, and replaced by a new table 7.2 which displays estimates of long term and short term land disturbances.

7. **Comment.** "The statement is made that 'Loss of habitat and reductions in population would occur as unavoidable consequences during the mining and use of coal.' Wildlife studies conducted the past five years at Peabody's Big Sky Mine have not shown a reduction in population due to the mining activity. The size of population appears to be more dependent on climatic changes and its effect on vegetation. In addition, additional acreage of certain habitat types beneficial to wildlife (i.e., reclamation areas and water impoundments) may be established. The statement also says that 'blasting, construction, and other noises associated with the mining activity would be unavoidable and would frighten away some wildlife species.' Wildlife species are adaptable to noise, as is man. Although animals may initially scatter at the time of a blast, studies have shown that a creature will generally remain within its territorial range. Elimination of surface water bodies would adversely affect waterfowl, but changes made by the mining activity can also be beneficial to waterfowl. Big Sky Mine has increased the waterfowl population in the area with the creation of shallow reclamation ponds. In essence, temporary disruption may occur, but long-term benefits could ensue. The statement should reflect this possibility. The statement remarks that 'In most cases, however, the diversity, density, and composition of the new populations would be altered from previous conditions.' Diversity, density, and composition are dynamic aspects of wildlife populations, and therefore constantly changing. Just because one of these aspects, or all three, may be altered to some degree does not necessarily mean that the impact is adverse."

Commenter 069

Response. Section 7.1.2 has not been altered to reflect these criticisms because (1) the elimination of vegetation during surface mining activity does eliminate habitat for species using the involved acreage and the carrying capacity for these species is therefore reduced (2) "some" sensitive species would not become habituated to intrusive noises and would therefore be frightened away, (3) the elimination of surface waters traditionally used for food, cover, and nesting sites generally is not replaced by the ecological features of a reclamation pond, and (4) in most cases human-induced changes in diversity, density, and composition of wildlife populations generally are more adverse than beneficial to the total ecosystem. It warrants mention, however, that environmentally sound mining and reclamation practices in many cases can minimize these adverse impacts and ultimately lead to the restoration of the ecosystem to its near natural state.

8. **Comment.** "Basic coal mining operations do not require large quantities of water, as it implied on page 7–2 (second column, first paragraph). Some water is used in coal processing facilities, but the only water used at some mines is for dust suppression and sanitary needs. Frequently, pit water provides most of the water requirements for a mining operation."

Commenter 069

Response. The large quantities of water referred to in Section 7.1.1.5 reflect the water requirements quantifications of Chapter 5's water impacts section. Although the individual water requirements of certain mines may be relatively small, the potential total regional water requirements are considered large.

9. **Comments.** "In that same Section (on page 7–8), statements are again repeated to the effect that reclamation will require from five to fifteen years in most areas. These statements are based on studies which were either conducted when there was little if any information available to accurately assess reclamation efforts on western coal mines or before the implementation of the strict reclamation requirements of applicable state statutes and SMCRA. These statements should be modified in view of these developments if for no other reason than that such assumptions left uncontested can result in enormous burdens to operators by extending and increasing bonding requirements unnecessarily. Such costs are, of course, passed on to the ultimate consumer of energy and products produced from coal."

Commenter 066

Response. Due to the SMCRA requirements concerning mining and reclamation upon prime farmland, the above-referenced statement has been deleted.

10. **Comment.** "In Section 7.1.3 (second full paragraph of the second column on page 7–3) a statement is made to the effect that prospects for higher wages in coal development areas would attract new people which would necessarily exceed the demand for labor and cause increases in unemployment. This statement would appear to be contrary to all experience to date with coal development in the West. The final impact statement should explain on what basis the Department asserts this statement since it is assumed in other parts of the Statement that coal development would severely decrease current unemployment rather than result ultimately in an increase of unemployment."

Commenter 066

Response. This statement is not included in the FES as it may not be the general case.

11. **Comment.** "In Section 7.1.1.2 the long term effects of mining on soils is discussed with the conclusion that some areas of the West would require hundreds of years for natural processes to reestablish fertile soils. This must assume that the disturbance of those soils will result from activity which will be clearly in violation of SMCRA which emphatically requires the segregation of all soils and the return and stabilization of all soils on mined areas. Perhaps this statement is referring to soil disturbances resulting from general population growth which are not controllable by operating companies. Under such circumstances, it should be made clear that this is not the responsibility of operating companies. Again, such extreme statements unnecessarily alarm all those who are already very concerned about increased coal development in the West and particularly agricultural interests. If space does not allow objective explanation of such statements then they should not be made in the first place. Such statements are even more incredible in view of other comments made in portions of the Statement. For example, in Section 7.1.2 (at the beginning of p. 7–3), it is flatly stated that mining simply would not be allowed in the first place on lands which could not be reclaimed and that bonding to insure reclamation would certainly continue after mining in areas where reclamation was particularly difficult."

Commenter 066

Response. In view of SMCRA, this statement has been deleted from Section 7.1.1.2 of the FES. It should be noted, however, that violations of SMCRA could result in such lengthy reclamation time periods and that mining activities do create the potential for these effects.

12. **Comment.** "It appears that the description of the long-term effects of the preferred program and its alternatives tends to disregard the mitigative effects of recent environmental protection statutes. For example, the possible disruptions to the hydrologic balance mentioned in the statement (page 7–2, first column, third paragraph) would not appear to be reasonable in view of the provisions of SMCRA which prohibit disruption of the hydrologic balance. Adverse water quality impacts (page 7–2, second column, second paragraph) will be greatly mitigated by waste treatment and erosion control requirements under the Clean Water Act and SMCRA. The statement seems to belie the effects of these statutes."

Commenter 069

Response. Section 7.1.1.5 acknowledges the mitigatory effects of SMCRA, but goes on to state how certain coal mining activities would increase the potential for some unavoidable degradation of local and regional water quality.

13. **Comment.** "Section 7.3.3 discusses productivity of lands as affected by reclaimability. Again, as in Chapter 5, statements are made which indicate that even though existing laws require adequate bonds to insure the ultimate removal of all structures will be left and the land so disturbed will never be reclaimed. It is not clear how or why the Department makes this assumption and it is certainly contrary to the express provisions of SMCRA."

Commenter 066

Response. Although SMCRA requires comprehensive reclamation efforts for lands disturbed by coal mining, certain buildings may not be subject to reclamation. This is particularly true where coal development induces community development or transportation facility development and associated buildings become a permanent feature of the environment. Most structures constructed in association with coal mining operations, however, will be subject to demolition during reclamation, as required by SMCRA.

14. **Comment.** "Although it is difficult to assess long-term ecological effects of specific stresses,

some comments can be made regarding potential consequences of coal development. For example, strip mining thick beds with shallow overburden can significantly alter drainage and erosional patterns. Mining can alter the quality and quantity of both surface and ground water, alter soil characteristics, and change the topography and geology of the land. Soils in arid and semi-arid climates recover very slowly, so loss of productivity could be a significant factor."

Commenter 089

Response. The issues raised in this comment regarding potential ecological consequences of coal development are addressed in Section 7.1.1.

15. **Comment.** "Table 7–3 should include references. For example, we cannot determine whether the table represents potential productivity on an annual basis or in total. Some of the estimates for reclaimed land in Table 7–3 are as much as ten times greater than current empirical data would show for unmined land.

Commenter 069

Response. Tables 7-3 and 7-4 have been deleted.

16. **Comment.** "The statement does not assess the long-run impacts of the environmental stresses which will be caused by the preferred program. The statement acknowledges that the preferred program and any other alternative involving significant amounts of coal development will create serious environmental stresses in regions where coal is mined. However, it does not attempt to estimate the impacts that these stresses will have on those regions. We believe that an evaluation of the long-run consequences on particular species and ecosystems within each region is also essential to any decision concerning Federal coal leasing policy. To its credit, the statement does attempt to address the issue of ecological impacts. Unfortunately, the assessment is too superficial to be meaningful; moreover, it relies once again on some questionable assumptions. For example, the statement estimates plant and wildlife losses by multiplying plant and wildlife densities by the estimated number of acres directly disturbed by coal development. (p. H–26)."

Commenter 089

Response. Without knowing specific sites or their location each alternative has an equal potential for impacting all or some of the characteristic environments in a region. Land disturbance, as a function of coal production, is a variable. By applying average or typical densities for vegetation and wildlife to these variations estimates of the relative magnitude of an alternative can be derived. Only when sites are better defined and boundary areas narrowed can impacts for a particular species be projected meaningfully. We believe the level of detail in the programmatic is appropriate to decisionmaking at this level.

17. **Comment.** "In a Nuclear Regulatory Commission Report of June, 1973 it was stated that, 'Disposal of the coal ash ... deserves radioactive waste management consideration.' What are the cumulative affects of long term radioactive releases from coal fired plants? This statement does not do justice to the subject whatsoever."

Commenter 118

Response Traces of materials that are harmful to man or his environment are present in raw coal. These materials include potentially hazardous trace elements, toxic compounds, and radioactive substances. The concentrations of these materials in the ash from coal-fixed plants may increase. Not enough information is currently available on the concentrations involved nor what concentration levels pose a health hazard.

18. **Comment.** "A discussion of long-term consequences resulting from the use of coal should allude to the belief among some climatologists that fossil fuel burning will lead to unacceptably high levels of carbon dioxide in the atmosphere. The resultant 'greenhouse effect' would increase the mean atmosphere temperature by several degrees, resulting in the onset of significant climatological changes. However, not all climatologists agree that increased atmospheric CO_2 will significantly affect the climate, and whether the net impact of any such climate change would be favorable or unfavorable is not known. Energy policy-makers should, nevertheless, be aware that possibly negative climatic impacts could result from increased development of coal resources."

Commenter 256

Response. The potential for coal development to cause increased atmospheric discharge which in turn could create its "greenhouse effect" is addressed in the Chapter 5 section on "Potential Air Quality Impacts".

INTRA-AGENCY COOPERATION

1. **Comment.** "A centralized decision making process, whereby the federal government attempts to control the rate and the location at which new mines will open, will have an anticompetitive effect on the marketplace by artificially limiting supply. In addition, such limitation on supply would have an inflationary impact through limiting the availability of coal to meet demands in a timely manner as they increase. (It does not appear, from the DES, page 8–17, Table 8–3, Federal Agencies Requested to Comment on the Draft Environmental Statement, that the Justice Department has been consulted in the formulation of the preferred program, as is required by the provisions of Section 15 of the Federal Coal Leasing Amendments Act of 1976, which provided for Justice Department participation in formulating the regulations and all aspects of the program in order to promote a competitive atmosphere)."

Commenter 087

Response. Government control over the rate and location of coal development on Federal lands is a necessary corollary of government ownership over the mineral resource. The debate whether the government should control larger amounts of land began in earnest in the late 1800's and has continued until the present. At every important juncture, the latest being the enactment of FLPMA, the Congress has decided in favor of government retention of lands. The question, then, is not whether the government will exercise control over the lands it owns, but whether it will do so in a wise way. In the specific area of encouraging competition, it is obvious that the government can play a very beneficial role. It can adopt bidding procedures that lower the entry requirements, it can set aside sales for small businesses, it can set low acreage limitations and stiff diligence requirements to prevent large companies from dominating important reserves, and it can lease to assure that potential market entrants will be able to obtain needed coal reserves. It can also refuse to lease where the issuance would tend to cause violations of the anti-trust laws. The preferred program contains all of these elements.

The Justice Department does have an important role in this process (see new text in 1.3.2.4), as does the Energy Department, which can issue rates on bidding systems and competition. Although Chapter 8 did not adequately outline consultation in the draft, the final statement sets out fully the consultation that took place.

2. **Comment.** "Section 8.1 describes in part several memoranda of understanding which are or will be executed by the various federal agencies with often overlapping authority for various portions of the federal coal leasing program. Although no deadline is suggested for the completion and publication of these memoranda, it would surely be highly desirable that such memoranda be available to the public for comment before or at the time of publication of the final impact statement."

Commenter 066

Response. Chapter 8.1 of the FES contains information on the availability of the MOU's.

GENERAL COMMENTS

1. **Comment.** "In this regard, I would like to interject another point. I might consider that there is also serious questions about their use of the interdisciplinary approach as required under NEPA. It requires a systematic and integrated approach, and I don't see that in the draft and, in fact, technically it could be illegal , if we really wanted to press it to maybe the fine lines."

Commenter 178

Response. The interdisciplinary approach was used during the preparation of the FES. For example, personnel trained in the following disciplines were employed: mineral and resource economics, community planning, computer programming, ecology, transportation technology, mining engineering, geology, forestry, biology, recreation planning, natural resource sciences, law, and personnel management.

2. **Comment.** "From beginning to end of the statement, economic benefits are downplayed and other values are overstated."

Commenter 136

Response. The purpose of this FES is to assess the range of environmental impacts due to any decision to adopt a Federal coal management program. Although strict monetary benefits and detriments are beyond the scope of this assessment, the socio-economic analysis does assess pertinent economic impacts. Also, the discussion in Chapter 5 on economic impacts of program alternatives has been expanded.

3. **Comment.** "The ES states that anticipated coal development in the Uinta-Southwest Utah region, which includes Delta County, exceeds the 1990 Department of Energy high production projection. Because coal production is expected to increase at a rapid rate without new federal leasing, we believe that the capacity of the area to sustain more growth should be carefully considered before any new leasing occurs."

Commenter 167

Response. This and other socio-economic effects are the subject of this FES and will be the subject of any future site-specific intraregional environmental analysis which will be prepared subsequent to tract delineation.

4. **Comment.** "The League of Women Voters believes that prime agricultural land and the water to make it productive should be preserved. A careful assessment should be made of the impacts of removing water from agriculture. There is a need for cumulative assessment of regional impacts to assure that the agricultural base of an area like Delta County is not destroyed."

Commenter 167

Response. The cumulative assessment of resource tradeoff decisions will be the subject of site-specific regional lease sales analyses, which would be prepared subsequent to tract delineation.

5. **Comment.** "There is another area of interest and that concerns resource conflict. The San Juan Basin coal region is underlain by the richest uranium belt in the country. The Power River Coal Basin is underlain by the second richest uranium basin in the country. Thus we find two major energy fuels competing for surface access. These concerns are not addressed in the federal coal management program. When you do exploration work for uranium, you need surface access to the sites even if they are very deep. You need to drill holes, you need a surface location to drill the holes. Even though there may be very deep coal, very deep uranium underlying very shallow coal, there are still resource conflict issues, in terms of just resource development that need to be developed in the final impact statement."

Commenters 137 and 146

Response. The cumulative assessment of resource tradeoff decisions would be the subject of the land-use plan/EIS process and site-specific intraregional environmental analyses, which will be prepared subsequent to tract delineation.

6. **Comment.** "Two counties in the SENCOG area with known coal deposits are Nemaha and Pawnee. Since the deposits are known to be along the western side of the Missouri River in Nemaha County in the Brownville area, there is concern for the bluffs and for historic preservation in the Brownville area. It is felt that efforts should be developed for administering the program with other federal agencies that own lands which have mineral deposits. In this case the Corps of Engineers."

Commenter 001

Response. As stated in Chapter 1 of the FES, this is a programmatic statement addressing the existing environment and impacts resulting from a Federal coal management program in a general way. The extent and amount of historical-cultural values encountered on Federal land varies considerably from area to area. It is essential that these values be discussed on a site-specific basis prior to adopting any specific plans or proposals. Chapters 5, 7, and 8 in the final statement provide a general discussion on the cultural, historical and archaeological resources as well as the consultation and coordination efforts that were initiated between Federal, state and local governments in preparing this programmatic ES. The Department coordinates its coal leasing responsibilities with other Federal surface management agencies.

7. **Comment.** "How can regional environmental statements be prepared before there is a national leasing policy? How can the impacts of a non-existent coal program be assessed? As we find later on in the Programmatic, these areas are slated to be leased first because of these premature regional environmental statements."

Commenter 165

Response. Regional lease sales environmental impact statements will not be prepared until the Secretary makes a decision to conduct sales. Regional environmental statements, as well as this FES, are prepared based on a number of Departmental options prior to any decision on a major Federal action significantly affecting the quality of the human environment. After the environmental impacts of these options are weighed a decision on a Federal coal management program can be made. It should be noted that the Federal actions

pending decision during the preparation of previous regional coal environmental statements were basically mining and reclamation plans or rail right-of-way application approves or denials. Since the Department will have augmented data bases for these regions, but mostly since these regions represent those areas with the highest coal development potential, it does seem most likely that leasing over the next several years would be mainly located in these regions.

8. **Comment.** "The greatest weakness, however, it seems to me in the Programmatic is in the lack of protection for communities against adverse social and economic impacts that will follow from coal development. Of course, I'm particularly concerned with the treatment of our region, the Uinta-Southwest Utah Coal Region, and particularly with the Uncompaghre Area. In the first place, the Department does not justify the need for further federal coal leasing in our area. Yet, because we have an adequate MFP and West Central Regional EIS, which have been rushed through, we suddenly find ourselves as one of the prime targets for coal developments in the nation. The Programmatic clearly reveals that in order to meet Department goals by 1990, the Uinta Region should actually take 3.2 million tons of coal out of production."

Commenter 164

Response. The purpose of the FES is to assess impacts including adverse community impacts and the mitigating measures thereof so that prudent programmatic decisions can be made. Furthermore, the FES does not indicate any regional coal production requirements for any time period, but rather uses a high, moderate, and low level of production estimates to assess the potential range of environmental impacts. The need for leasing targets will not be decided until the Department has had time to weigh the results of this first EIS.

9. **Comment.** "We feel that greater consideration should be given alternative uses of the federal lands—for example, agricultural and recreational values should be given a higher status vis-a-vis the value accorded the coal resource."

Commenter 160

Response. Resource tradeoff decisions would receive due consideration during the land use planning phase of the program. Except for those values protected by unsuitability criteria, which do include some protection of agricultural and recreational sites, decisions are made on their case-by-case merits.

10. **Comment.** "Contacts or involvements of the Soil Conservation Districts are not mentioned. The impact of mining and related activities should be made known to local Soil and Water Conservation Districts."

Commenter 116

Response. It is the policy of the Department to provide all copies of coal-related environmental statements to the Department of Agriculture for review. Accordingly, the Soil Conservation Service is provided a means to the requested information. SCDs could obtain information in this way or through local notices of actions and meetings put out by the BLM and FS.

11. **Comment.** "The ES fails to describe the relationship between coal management in general and other major Bureau programs such as grazing plans and the wilderness inventory. There is no discussion of areas of critical environmental concern and how differing interpretations of that concept could affect existing leases."

Commenter 060

Response. During the land use planning phase of the program, resources tradeoffs, including those resources managed under other major Bureau programs would be weighed prior to any ultimate resource development decisions. Also during the land use planning phase, critical environmental concerns would be considered. ACECs are not a direct feature of the coal programs. For further detail refer to the land use planning text of Chapter 3, and to the proposed BLM planning regulations (Federal Register, December 15, 1978).

12. **Comment.** "Also, from an environmental impact point of view, do we really want to increase production in certain geographic areas at the expense of other geographic areas? By increasing production in the Powder River Basin, we would be concentrating impacts in this area and along the already overcrowded Burlington Northern rail corridor, which connects this area with its logical markets in the Midwest."

Commenter 197

Response. It is true that by increasing coal production in the Powder River Coal Region, adverse transportation impacts would be intensi-

fied along existing rail corridors, as identified in Chapter 5. Western railways, however, are aware of this potential and have begun efforts to improve their transportation facilities. The question of concentrated regional development is a valid issue of which the Department will weigh the pros and cons prior to any decision on the Federal Coal Management Program. Generally, the level of leasing of coal in any region is determined by the competitiveness of the coal in the market place.

13. **Comment.** "There is no word in the Environmental Impact Statement concerning how existing mines will be treated. We would submit to you that this is a flaw, in this Environmental Impact Statement, because if it is the Department's objective to lease and produce the maximum amount of coal with minimum environmental impacts, then certainly existing mining operations deserve special consideration, because these mining operations can double and even triple with very few, if any, environmental or socioeconomic impacts."

Commenter 197

Response. It is true that existing mining operations can, in certain instances, increase production without creating a proportionate increase in environmental impacts. However, whether these high levels are sustainable or cost efficient is questionable. The jurisdiction of this Federal Coal Management Program, however, concerns the future management of coal resources on Federal lands. This program provides for an orderly rate of mine development and protection. To this end Chapter 2 addresses the production potential of Federal coal.

14. **Comment.** "Criteria and guidelines for the protection and recovery of paleontological resources have not been released; therefore, the public is unable to evaluate those resources and potential impacts."

Commenters 069 and 109

Response. Paleontological resources are a new responsibility for the BLM and the criteria and guidelines for their protection, recovery and inventory are in an embryonic stage.

Interim guidelines were issued in a BLM instruction memorandum (79–111, Nov. 29, 1978). These interim guidelines will be developed further in the near future so that paleontological resources can be fully integrated into the BLM inventory planning system and achieve a position equal to that of other resources on the public lands.

15. **Comment.** "It can be stated categorically that no one, today, can know whether they will be able to mine coal from a federal lease until they have gone down the long, long road above described and have in hand all the local, state and federal permits required to be able to legally mine coal. There can not possibly be a significant impact on the human environment from a coal mine until there is, in fact, coal that is legally available to mine and legally mineable. That can not be known by the federal government, or by a lessee of federal coal, until the lessee has in hand all of the required permits. In the process of obtaining all the required permits, a legally adequate 'site-specific' environmental impact statement must be prepared before the proposed mine plan will be approved. Therefore, it is the approval by the federal government of the mine plan, not the issuance of a lease, that is today the 'major federal action significantly affecting the human environment'."

Commenter 053

Response. The application of NEPA to the process of issuing Federal coal leases and granting mining permits is far from settled; several court cases which will help resolve this question have not been finally decided. These include *Sierra Club* v *Andrus* (Does the Department have to prepare an environmental statement before it issues a geothermal lease) and *EDF* v *Andrus* (Does the Department have to do an environmental statement on a detailed development plan for an oil shale lease where it has done an environmental statement prior to lease issuance). At what point in the process does the Department irretrievably commit resources and allow actions which significantly affect the human environment? When does a statement done on a general topic satisfy the need for a statement on a more specific application? The potential solutions to the problem are complex and worthy of extended discussion.

The process leading to mining of coal from a federal lease is a series of steps each of which narrows the options available to the government and industry and increases the resources that have been committed to a particular project, and limits the usefulness of each additional commitment except for how it promotes mining.

Completion of a Land Use Plan

Preparation or revision of a land use plan involves a moderate commitment of Interior's resources, to prepare the plan, but the information obtained has broad applicability. Information gathered to see if coal development is potentially a wise use of land can also be used to evaluate grazing or wildlife needs, or to make decisions on wilderness design characteristics. No other uses are precluded by adoption of a plan, no rights are granted to a private party, since only those areas totally unsuited to coal development are eliminated in the plan. The Department neither commits itself to issuance of a particular lease, or to a particular level of development in the planning unit. Identification of potential, not commitment is the goal of a land-use plan, while it does take effort to do a land-use plan, the effort is a general one and gives only minimal drive to mining.

Industry's committment is similarly limited. It may expend money to gather information to submit to the resource managers, but it gains no expectation of rights nor can it rely on the eventual outcome. To both industry and the Department *excluded* not *included* activities is the focus of the land-use plans.

Lease Issuance: Delineation, selection, ranking of tracts and preparation of sale schedules and issuance of a lease entail a Department commitment of resources on an entirely different scale than that done to complete a land-use plan. The work done at this stage is important or needed only if coal leasing will be done. It is a more intensive focusing on the resources involved and the committment rises extensively. Lease issuance is also the time when the Department makes the basic commitment to allow coal to be mined by a particular company at a particular site. Under the preferred program, the procedures leading up to lease issuance will give the answers to a broad variety of questions. Is there good coal at the lease site that can be mined under today's economic conditions? Are the social impacts of development acceptable? How will mine development affect state and local financing? Is it expected that the eventual lessee can meet all environmental laws? Lease issuance is also the threshold point for industry; the fundamental relationship between a company changes when a lease is issued. The company is no longer a mere applicant for a right, someone with a hope of mining; it is a holder of a prescribed set of rights and has to undertake a specified set of duties. It must pay "fair market value" for its rights, pay rent and begin to prepare a mining plan for submission within three years. Pre-lease expenditure might be limited to several hundred thousand dollars at the most; post-lease expenditures will rise into the millions of dollars. Both for the Department and industry lease issuance is a crucial expensive step needed to mine coal. Even though the company's rights are conditioned the performance of certain actions and compliance with all laws, the relative position of the parties has greatly changed. There can be little doubt that it will be enormously more difficult to refuse to approve a mining plan than it would have been to refuse to issue a lease. As the commenter notes, however, issuance of a lease does not mean that mining will necessarily occur. It does mean that mining will occur if it can do so consistent with the lease and all applicable laws and regulations. To date, there has been no case where mining has been totally disallowed on a Federal lease despite the fact that virtually all leases were issued before Congress enacted NEPA. Despite the possibility that mining may not take place, because of the high likelihood that it will occur, and because of the fundamental change in degree of commitment by both industry and government, the Department feels it must do an environmental statement before it issues a lease.

The need to do an environmental statement *before* lease issuance is consistent with the Departments view that it is overwhelmingly in the public interest to resolve basic questions about the desirability of coal development as early in the process as possible. In other words, to save everyone time and money, everyone should take their best shot at whether to favor or oppose coal leasing at a particular location before a lease is issued, technical consideration on *how* to mine the coal should be everyone's concern; a leaseholder should not have to suffer delay while people endlessly argue *whether* leasing should take place.

16. **Comment.** "Table 5–6. No units of measurement."

Commenters 019 and 135

Response. The unit of measure for DES Table 5–6 is thousands of acres. This error is corrected in the FES.

17. **Comment.** "Moreover, consideration should be given to the effect of the passage of the Surface Mining Control and Reclamation Act (SMCRA) on the injunction issued in *NRDC* vs. *Hughes* and whether since the passage of the SMCRA, any federal leasing can be considered a major federal action with significant effect on the environment in view of the fact that the lessee must still comply with the severe environmental constraints of SMCRA. Should the department still consider itself bound by the mandates of that injunction, which caused the preparation of this document?"

Commenter 087

Response. The Department does not feel that the enactment of SMCRA eliminates the need to prepare an environmental statement on the coal program, although it does confirm that this statement should focus more on ways to analyze need for leasing and broad impacts of coal development rather than standards for mining at specific sites. While at times the obligations to prepare a NEPA statement seem more procedural than substantive, the Department considers this statement to have been most helpful in preparing to make decisions on a crucial range of issues that have developed over the years. Because the papers which formed the basis for the proposed program were used heavily in this statement, consideration of environmental impacts was truly a part of the decision-making process. The Department has for the first time gotten a good feel for the potential relationship between total production and Federal leases, for the potential of production from existing leases, the role of split-estate lands, and a host of other important factors, as well as the effects of different development levels in different regions. Even with the excellent standards set by SMCRA, these are important questions requiring independent evaluation.

18. **Comment.** "Further, under the Federal Land Policy and Management Act of 1976, which I refer to as the Organic Act, new rules and regulations are being formulated with public hearings to begin about May, and so forth, on April 1st, I believe. Again, somebody else has referred to it.

"My big point here is, going back to this cornerstone, again, how can this particular very important Draft Statement be made without, you know, regular Congressional formulated, authorized type procedures? And, in this event, this act calls for broad management authority under the principles of multiple and sustained yield—and mining is not a multiple use—inventory and indentification and mapping of public lands—and, as I understand, there is a big data lack, you know, several years in some of the areas they have studied—and also comprehensive land-use planning.

"To go ahead with an environmental statement which does not have the rules, regulations, and provisions of this Congressional act firmly set out with public inputs so people can really say what's going to happen with these regulations and use those as the cornerstone would be questionable unless we have them firmed up.

"The wise course of action would be to develop the various provisions, rules and regulations with ample public hearings of the Federal Land Policy and Management Act under comprehensive land-use planning into final form rather than proceeding with an unsound draft environmental statement for the benefit of energy corporations who are pushing to get the coal leased for their private interests."

Commenter 178

Response. A new subsection has been added to section 5.4 of the FES to respond to this and similar views.

19. **Comment.** "Figure 2–1. This map is illegible. I suggest it be made into smaller maps."

Commenter 019

Response. The quality of this map has been improved for the FES.

20. **Comment.** "This draft environment statement determines that by the year 1990 solar energy will not contribute more than one or two percent of the total water and space heating requirements of the U.S. In a crisis determined to be the moral equivalent of war this nation would be wise to devote its available resources to the rapid development of this relatively benign energy resource rather than pursuing programs where the environmental tradeoffs for the net energy gain are unacceptable."

Commenter 047

Response. The development of solar energy is being actively pursued by the Department of Energy. Despite these efforts it appears unlikely that solar energy technology will be perfected by 1990. The President's National Energy Plan calls

for a major role for coal for supplying the Nation's energy needs over the coming decades. The Department of the Interior is studying the alternative means of Federal coal management in an environmentally acceptable manner. The decisions on the energy mix strategy for the Nation to take do not belong to this Department.

21. **Comment.** "Also, the expression "pounds of trout/acre foot of stream" is a very unusual one and is in desperate need of clarification and/or definition. Under the wetlands critérion, it should be specified whether the 5cfs is an average flow, a minimum flow, or which specific flow is intended. The Falcon Cliff Nesting Site Criterion (page 3–12) is not printed properly in the table - a portion of it is printed on page 3–10. Apparently page 3–12 should come between pages 3–9 and 3–10."

Commenter 121

Response. The FES contains the suggested juxtaposition of pages. Pounds of trout per acre foot of stream refers to the average unit weight measure of the trout population in a given unit surface area of a stream. For example 100 pounds of trout per acre foot of stream would mean that there could be 100-one pound trout or 10 - ten pound trout in an average acre of a stream. For clarity this unit measure has been changed to pounds per surface area. Unsuitability criteria will be re-evaluated and changed as needed in light of all the comments received and in light of the ongoing field tests.

22. **Comment.** "We would like to have seen considered as serious national policy options, such alternatives as seeking repeal or at least clarification of much of the environmental legislation of the past ten years and also consideration of a policy that eventually would convey ownership of all federal coal into private hands. There has been much made over the 'fact', the accuracy and meaning of which is still in dispute, that a disproportionate amount of federal coal is under lease relative to the amount produced from federal lands. Further, that speculation is rampant and that industry is withholding federal coal from market for self-serving reasons. This line of reasoning usually arrives at the conclusion that consequently there is no need for any additional federal leasing in the foreseeable future.

"We believe this to be a gross misinterpretation of the situation and that the conclusion is in error. To us, the fact that 93.5% of national coal production in 1977 came from non-federal lands does not suggest we discontinue federal leasing. Instead, it strongly suggests that in order to increase production from Federal lands, the lands should be under non-federal control. Leasing is at least a step in that direction and the fact that only 791,000 acres are under lease of the 11.5 million federal acres within Known Recoverable Coal Resource Areas, which in turn is only a small part of the approximately 100 million acres of coal rights owned by the federal government, borders on the criminal for a nation hungry for domestic energy supplies. Just imagine the furor if a private corporation held such dominant control of a resource and similarly refused to allow it to be developed! And regarding speculation, we can think of no better way to encourage speculation than to withhold the major portion of a resource from the market—that is certain to drive up the price of remaining available lands."

Commenter 066

Response. The Department believes that the suggestions to repeal all the environmental legislation of the past ten years and to convey ownership of all Federal coal into private lands are unworthy of response.

23. **Comment.** "All related regulations which may affect the coal leasing program must be published in the FES. All other pertinent documents such as solicitors opinions, internal memorandum and the like should be gathered under one office and made available to the public without requiring an FOIA request."

Commenter 118

Response. The Department has considered printing the final surface mining regulations and the proposed BLM planning regulations under FLPMA in the final EIS. At this time we do not believe the benefit from making this ancillary information available outweighs the cost of printing, especially the cost of paper. We are also concerned that we might discourage some readers with the sheer bulk of the EIS. Final copies of those memoranda anticipated to be of interest to the public have been gathered in one place and are available upon request until supplies are exhausted. These documents are available from the BLM, Office of Coal Management (142), Washington, D.C. 20240. If supplies of these memoranda have

been exhausted or if the request is of a memorandum for which the Department did not anticipate a request, there may be a slight charge to defer duplicating costs. The Department certainly prefers to avoid the formality of an FOIA request whenever possible.

24. **Comment.** "The process has a built in 'chicken-egg' enigma relative to tract leasing (especially so for underground mining). Namely, the resolution of the issues raised in land planning unsuitability criteria, resource evaluation, tract selection and ranking, Regional production quotas, State government, public and industry views, site-specific impacts, and cumulative effects. Unless the data is available from all sources simultaneously, it would seem impossible to reach a decision."

Comment 282

Response. Options for achieving data efficiencies, including the pooling of data used in making decisions on other resource programs are being examined by several task forces that include participation from the Departments Bureaus and Offices and from other Federal agencies. Programs for sharing data should improve the decision making by all parties involved with the management of Federal coal.

25. **Comment.** "The responsibilities of the Geological Survey are either poorly addressed or ignored. The EIS implies that the Office of Surface Mining (OSM) has the sole management role. The role of the Geological Survey in conservation and recovery of the resource should be adequately and precisely defined."

Commenter 041

Response. The USGS has been represented fully in all the deliberations bearing on the development of the coal management program.

26. **Comment.** "Section 2.4 of the DEIS discusses the Clean Air Act Amendments of 1970 and 1977 on power generation. This section is conclusory in style and should be expanded."

Commenter 090

Response. A brief summary of EPA estimates of alternative sulfur standard impacts on western coal production has been added to Section 2.4. Discussion of the litigation and other details concerning these standards would go beyond the scope for this EIS.

27. **Comment.** "We hope that the Department will continue to follow this splendid example in how to write a program EIS in its subsequent EIS efforts. Past DOI efforts have been overly formalistic, highly structured and very short on culling out issues of significance. We think this present EIS does a commendable job in initiating the spirit of the Council of Environmental Quality's new regulations stressing conciseness and attention to decisionmaking issues in EISs. We do think that larger print would be advisable in the final EIS in view of the extensive information contained throughout the document. The EIS could also use a comprehensive Table of Contents."

Commenter 281

Response The FES contains enlarged print size and a comprehensive table of contents

APPENDICES

1. **Comment.** A large number of commenters expressed concerns with the various components of the Example Regulations in Appendix A of the DES.

Commenters 048, 052, 055, 061, 077, 082, 087, 089, 090, 097, 098, 099, 102, 104, 120, 122, 130, 133, 281, and 282

Response. All comments on the Example Regulations were considered during the preparation of the Proposed Regulations. In many cases Departmental changes from the Example Regulations were instigated by these comments and incorporated in the preliminary rulemaking published March 1979, in the Federal Register. These comments are fully discussed in the preamble to that rulemaking.

2. **Comment.** "Moreover, due to the provisions of the Department of Energy Organization Act, we feel that there is a legal issue as to whether the Memorandum of Understanding between the DOI and DOE attached as Appendix B to the DES, may be in violation of the said Act and also whether the production target process described in the preferred program is in conformity with either the Department of Energy Organization Act or the said Memorandum of Understanding."

Commenter 087

Response. The Department believes that both the Memorandum of Understanding and the preferred program meet the mandates of the Department of Energy Act. We have made some

corrections to the description of the proposed program in Chapter 3 and to the example regulations to clarify that the starting point for the regional prediction process is the DOE production goals when they are available. In other words, while the statement presents a range of figures for analyses and evaluation purposes, the program will start with a set of figures suggested by the Department of Energy. The commenter does not suggest any specific problem or shortcoming; our response is necessarily equally general. The Department encourages more specific comments as part of the rulemaking process.

3. **Comment.** "Table C–1. The figure of 1,750 tons per acre-foot conflicts with the figure of 1,770 tons per acre-foot which must be used according to USGS General Coal Mining Order No. 1, dated July 3, 1978."

Commenter 019, 135

Response. This difference is not considered significant enough to warrant change.

4. **Comment** "Appendix C, figure C–3. This figure is incorrect and misleading. It shows a continuous miner and conventional equipment in the same mining section. Separate figures should show the utilization of each type of equipment. Pillar recovery should also be shown for each system, preferably on a separate figure."

Commenter: 041

Response This figure is a generalized presentation of an entire mining process. Although separate figures may be appropriate, they are not considered to be warranted for this general degree of detail.

5. **Comment.** "The discussion of endangered species in the Uinta-Southwestern Utah Region indicates that '... at least 10 endangered species occur in this region. Presumably this includes the Yuma clapper rail listed in Appendix Table D–2, page, D–7. This species has never been observed in Utah and should be excluded from that table."

Commenter 093

Response. The regions as originally mapped appeared to include Arizona, Colorado and Utah. The actual production region (see Figure 1–1 and Appendix J) shows only Colorado and Utah, thus Yuma Clapper rail has been deleted from list since distribution appears limited to California and Arizona.

6. **Comment.** "I will cite an example. I believe there is a statement in here to the extent that one animal requires 11 acres of land in order to graze adequately. The figure is probably something more like one animal for every 22 acres. The argument has been made that this land is generally unproductive and for that reason it would be worthwhile to develop the coal reserves in that area. Well, I submit to you that you should probably be considering alternatives having to do with scaled-down development for the San Juan Region for the very simple reason that the people who are there have no place to go and they do depend greatly on grazing for their livelihood. Any mining of the coal, taking into account the ratio that you propose for animal grazing in this area, will essentially short-change and put a lot of people below the poverty level than are already below it at this point."

Commenter 138

Response. The referenced statement has been changed to reflect a grazing requirement of one animal per 22 acres in accordance with this comment. The preferred program would provide for analysis of regional socio-economic impacts, including proposal of appropriate mitigation techniques. Persons from different cultural backgrounds have different capabilities to adapt to change; such facts would be considered in the regional lease sale EISs.

7. **Comment.** "Appendix D - Ecological Data. The Uinta-Southwestern Utah portion of Appendix Table D–1 should be modified to include one antelope per 150 acres and one mule deer per 50 acres. Division of Wildlife Resources' estimates of carrying capacity for 15 deer herd units in Utah averages one deer per 47 acres.

"Also we wonder if the pounds fish per acre-foot values included for streams and reservoirs should be pounds per acre. The values reported seem high where expressed on an acre-foot basis."

Commenter 093, 121, 266

Response. Table D–1 has been modified as indicated. Pounds per acre-foot has been corrected to read pounds per surface area.

8. **Comment.** "Table D–1: Estimated Regional Carrying Capacities and Primary Productivities. The acres per animal figures for some big animals are low. For example, one mule deer/100 acres in Uinta-Southwestern Utah region. The average

capacity for 15 herd units in Utah is one mule deer/47 acres based on Utah Dvision of Wildlife Resources data."

Commenter 266

Response. Carrying capacity for mule deer has been changed in the FES as noted.

9. **Comment.** "In earlier correspondence we recommended that potential losses of wildlife incorporation in Table D–5, pages D–13 through 34, be identified in terms of habitat units, not animal numbers. We reiterate that recommendation here. It is the Division's position that the numbers shown do not provide an adequate base for impact assessment or ultimate establishment of thresholds."

Commenter 266

Response. Habitat units would have more meaning at a regional or site specific level. In comparing alternatives, without knowing where actual mining activities would occur, all potential habitat within a region would need to be identified-thus no apparent difference would be detected. Once sites are determined, and if aerial photos are available or can be easily obtained, habitat units can be determined, and differences between sites can be determined. The level of detail then required (e.g. species or category such as game animal) can be applied more meaningfully.

10. **Comment.** "The references cited for the sources of information in Table D–1 are too general in nature for the uses to which the data is put. More site-specific studies should be cited. Much of the data were obtained as values for an entire state and used as regional values. For the San Juan River Region, 11.04 acres/animal unit is extremely low; a more believable value would be 11.04 acres/animal unit *month,* which would translate to 132.48 acres/animal unit, a more believable figure (USDA, Soil Conservation Service, 1977. Technical Guide, New Mexico: Technical range site description.) The value for productivity of 4.5 tons/acre/year (Table D–1) or 3.2 tons/acre/year (Table H–15) is far too high. The Soil Conservation Service estimates productivity for several range sites in the San Juan Basin to be approximately 500 pounds per acre per year (USDA, Soil Conservation Service, 1977. Technical Guide, New Mexico; Technical range site descriptions). Corn productivity is alleged to be 96.6 bushels/acre/year for the San Juan Basin; however, the official New Mexico Agricultural Statistics, 1974, produced by New Mexico State University list average *irrigated* corn production in San Juan County in 1973 as 50 bushels/acre and in 1974 as 60 bushels/acre. The productivities of all crops for which values were found in the literature were below the values used in this document. All regions contain suspect productivity values. Similar productivity values also appear in Tables H–15 and H–17. The calculation of potential loss of animal units does not take into account the data in Table H–14 on allocation of land to various land-use categories; the values are calculated on the basis of each land-use category comprising 100% of the land area. Tables D–5 through D–26 are therefore suspect due to the questionable values used in the calculations of potential losses of plant and animal productivity. The use of computer modeling to derive potential biomass losses does not negate the importance of using a proper data base."

Commenter 088

Response. The references cited in Table D–1 are necessarily general because of the areas involved. As areas become better defined, data specific to given sites, if available, should be used. The intent at this level of analysis was to provide comparison among alternative leasing options.

Data used in most cases were the typical average values for each state contributing to the region. For example, average corn for grain yields for New Mexico, Colorado, Utah was 98.3 bushels, 103.3 bushels and 88.3 bushels, respectively, between 1975 and 1977. This gave an average of 96.6 bushels which was multiplied by an estimate of the amount of land assumed to be in corn. Whether the acreage alloted to corn is actually in corn, or potentially available to grow corn, and exact yields are simply beyond the scope of this document. This is not to suggest that any number could be used without some data base. It is fully expected that more representative data will be used when areas are narrowed and better defined.

Several comments have been received on the value used for animal units in the San Juan Region, ranging from the value is 10 times too high to the value is two times too low. The value of 11.04 acres/animal unit is the average derived from U.S. Department of Agriculture, Agricultural Statistics, 1975. Because of comments received it has been changed to 22 acres/animal unit/month.

With the exception of big game animals, as indicated in Table D–1, all other wildlife population estimates and animal units were derived from total acres times estimated population densities. While the percentages alloted to the various land use categories may suggest that a category occurs as a discrete unit, the regions were assumed to have a mosaic pattern of vegetation. Where grassland or range occurred continuously over broad areas, it is probable that grazing animals may remain only on range. Where range is broken by other types, it is probable that grazing animals may pass through or use these other areas for some periods of times.

11. **Comment.** "In this section, revegetation of range in Texas is stated as taking three years, where in Section 7.3.3 the same vegetation in Texas is stated as taking one year."

Powder River	1 game mammal/13 acres (7-5), 1 game mammal/33 to 200 acres (D-1)
Green River	1 game mammal/13 acres (7-5), 1 game mammal/66-250 acres (D-1)
Fort Union	1 predator/500 acres (7-5), 1 predator/3,200 acres (D-1)
Denver-Raton Mesa	1 game bird/5 acres (7-5), 1 game bird/1 acre (D-1)
Denver-Raton Mesa	13.7 acres.animal unit (7-5), 1.6 acres/animal unit (D-1)

In reviewing the two sets of data, Table 7–5 and Appendix D–1 seem to imply that reclaimed land in the Powder River, Green River, and Fort Union Regions will support three (3) to nineteen (19) times the relative wildlife population said to exist naturally, while the Denver-Raton Mesa will support a wildlife population five (5) to nine (9) times *less* than exist naturally. Explanation of this extreme variance is needed."

Commenter 069

Response. Data in Appendix Table D–1 has been checked and corrected. Table 7–5 has been eliminated.

The discrepancy between Table D–1 and Table 7–5 lies in the estimates of carrying capacity (D–1) which are based on density estimates of *occupied* habitat. Data in 7–5 presents estimates if all area is occupied habitat. This discrepancy should be eliminated once areas become better defined and site specific data can be applied.

12. **Comment.** "DOE quotes the carrying capacity of the land which will be mined here (Table D–1) at 11.04 acres per animal unit, a figure exaggerated more than 10 times. It projects a grassland productivity of 4.5 tons/acre/year in this same region when usable forage actually ranges from 0 to 250 lbs./acre/year. When fish production in reservoirs in the San Juan River Region are given as 250 pounds of fish/acre foot, it becomes apparent that prejudices against Western Coal development are a part of the leasing plan. I have been involved in fisheries research 25 years, and this is my first experience with fish productivity given in acre feet and not surface acres except when deception or a hard sell were intended. The very fact that highly productive Texas reservoirs are shown to have approximately one-half this carrying capacity when they should show nearly twice as much does not appear to be error, but attempted deception."

Commenter 136

Response. The carrying capacity has been changed to 22 acres per animal unit based on comment 4. U.S. Department of Agriculture 1975 statistics indicate that about 25 acres per animal unit are required in Arizona and New Mexico, 9 acres per animal unit in Utah and 7.7 acres per animal unit in Colorado for an average of about 16 acres per animal unit for these four states which contribute to the San Juan Region. The figure of 4.5 tons per acre per year (grassland productivity) is from L.E. Rodin et al, 1975 and reflects an average for semiarid regions (subboreal belt). No doubt actual site productivity will vary from this figure. If 250 pounds per acre per year is an acceptable figure that be referenced, there is no problem in changing the multiplier to reflect this.

There is no intended prejudice or attempt to deceive by using a higher figure for fish productivity in San Juan. Carlander, 1955, figures for standing crops of fish were used for this estimate. A figure of 25–150 pounds per surface acres was used for Texas since it seemed to fall into the category of warm-water lakes, while 250 pounds surface acres was used for San Juan since there was no category specific to that region. Carlander lists a standing crop of between 200–300 pounds per surface for "other reservoirs and ponds." Standing crop should have appeared as pounds per surface acre and not pounds per acre foot as listed.

13. **Comment.** "The thing that really caught my attention was the 455,000 acres to be disturbed in the Texas Region of this plan, which the plan says includes mining and coal handling and preparation facilities, 455,000 acres to be disturbed between now and 1980 would produce 370,000 tons of coal a year, figuring 10,000 tons per acre, a figure which is 20 times what is being produced there now, a figure which to anyone has to be nonsensible."

Commenter 136

Response. Acres committed are being revised to better reflect actual land requirements to support a given coal production. In the original draft, a yearly total of land required for mining and a consuming industry was multiplied by the time period to give total land requirements. The error in this is that it assumes that land required for a consuming industry would increase at a much faster rate than was actually needed.

14. **Comment.** "The following data were acknowledged as erroneous by Mr. Uram, Mr. Van der Walker, and Mr. Moore on January 3, 1979 at the informal meeting in Albuquerque. These, too, must be corrected, since they imply a productivity from San Juan Basin that simply is far from accurate.

a. Table D–1, page D–3. The Figure of 11.04 acres/animal unit/year is acknowledged by the BLM's Albuquerque District as inaccurate. The figure given by the BLM for the Star Lake-Bisti Region is 12.52 acres/animal unit/ *month* . The figure given in the Programmatic should be revised.

b. For sagebrush steppe the Programmatic gives a figure of 1.8 tons of productivity per acre. The BLM's Albuquerque District was unable to provide an accurate figure, but estimated that 1,000 pounds per acre would be excessive.

c. For Grasslands the Programmatic gives a productivity of 4.5 tons per acre in the San Juan Basin. A 1974 figure for intensive hay production in Illinois *(FES Related to the Proposed Braidwood Station,* done by Commonwealth Edison and accepted by AEC) predicts only 2.92 tons of productivity per acre. To suggest that the San Juan Basin is 2X as productive as the heartland of mid-America is ludicrous.

d. Table D–1 also gives productivity figures for corn, hay, wheat, cotton, and sugarbeets. None of these crops are presently grown on any potential coal lands in the San Juan Basin. The current use and likely end use of these lands is grazing. Moreover, cotton is grown in new Mexico no farther north than Socorro, 60 miles south of Albuquerque."

Commenter 019, 135

Response. Appendix D has been revised to reflect more accurate information.

15. **Comment.** "The statement undervalues the productive ability of western lands. This in conjunction with the inadequate assessment of reclamation in the West, results in a vast underestimation of the long-term loss of productivity and renewable resources."

Commenter 061

Response. Estimates of the productive ability of western lands are from Rodin et al (1975). Productivity of the world's main ecosystems are average productivity value for type of vegetation. They do not reflect specific productivity for a given area. This can only be determined by productivity measurements of the specified tract.

16. **Comment.** "Coal development projects, in particular coal slurry transport and coal gasification (as described in Appendices C and H) use large quantities of water. Thus, water availability may become a very serious problem to some areas with marginal or insufficient quantities of water required for the operations of the existing hydro and/or other developments, for example, in water deficient parts of the Central Plains and southwestern states. Water impacts (Chapter 5) would be more effectively demonstrated if water deficit, the difference between the minimum available and maximum demand in water for each particular region during critical periods, was included as one of the impact evaluation criteria."

Commenter 117

Response. Appendix E addresses total stream flows and consumptive water requirements. The tables in Appendix E indicate on a per month basis the amounts of water available and needed for the Federal coal management program.

17. **Comment.** "The WRC report 'The Nation's Water Resources' was referenced as the source for

the Consumptive Water Requirements shown in Appendix E. It appears that these consumptive use figures may be high for the Missouri River Basin. Therefore, the streamflow impacts in the Missouri River (Tables E–4 and E–7) may be somewhat exaggerated."

Commenters 204, 028

Response. Table E–12 explains the rationale for the data, as well as their source. The data are not considered to be exaggerated.

18. **Comment.** "Appendix F presents coal production projections by state and includes projected in-state coal consumption as well. However, the process used to derive these numbers is not indicated. The manner in which Appendix F supports or is incorporated into the main body of the EIS is also not explained in the Appendix, although references may exist in the body of the text. The Montana and Wyoming shares and total Powder River production are summarized as follows (from Tables F–2 and F–3) in million tons per year (mtpy): Production Consumption data.

"There are several obvious problems with this data. In 1976 Wyoming power plants consumed approximately 7.5 million tons of coal (mt) in electric generating plants and Montana plants consumed approximately 2.3 mt. It is not clear why Wyoming consumption is projected to be lower in 1985 than in 1976 and why Wyoming consumption is lower in both 1985 and 1990 than Montana since more coal-fired generating projects are already in operation or scheduled for construction in Wyoming. The Montana coal consumption projects are not unreasonable in light of future planned facilities which the state is aware of. However, if low BTU coal gasification by 1990 is among facility construction plans for Montana, the state of Montana would like to be informed.

"On p. 2–24, three actions are specified which will be undertaken at the national level to address the problem of growing energy demands; these include expanded domestic use of coal, increased foreign supplies of oil and gas, and greater energy conservation. We in Montana would like to see a fourth action added, namely, to allocate the necessary support and research efforts required to increase reliance on renewable forms of energy."

Commenter 121

Response. Low-Btu projections were not based on any specific new construction plans, but on general energy demand considerations. National energy planning includes greater reliance on solar energy and other possible renewable resources. However, for the short run, these sources do not appear likely to provide a major contribution to national energy. The difference in Montana and Wyoming projections appears attributable to different power plant sizes.

19. **Comment.** "Table F–1 says 27,400 people, or 16% of the population of northwest New Mexico is coal-related population. The BLM's Star Lake-Bisti Regional EIS states that only 3,475 people were coal-related in 1977, and this includes basic and non-basic and indirect employment plus families. This discrepancy must be addressed, since carried further in later tables it suggests that coal-related socio-economic impacts will be far greater than they actually will. Tables F–2 and F–3 show the same great discrepancy discussed in Item No. 41 above."

Commenter 019, 135

Response. The boundaries and consequently the data bases for the Star Lake-Bisti ES and the San Juan River Coal Regions differ.

20. **Comment.** "What is the source of the Appendix F data?"

Commenter 121

Response. Appendix F data is based on the detailed DOE production projections adjusted for the estimated impacts of alternative Federal coal management programs.

21. **Comment.** "Table G–2 differs enormously from approximately similar tables in the Star Lake-Bisti Regional EIS. For example, (Page H–7) DOE's National Coal Model (NCM) was run with the assumption that the Federal Government would lease enough coal reserves such that the reserves cheapest to be mined would be mined first. How would the results of the NCM change if this assumption was not made?"

Commenter 091

Response A DOE and DOI report, Effects of No Further Federal Leasing on the Nation's Coal Markets (draft January 1979) can be obtained which analyzes this question."

22. **Comment.** "In Table H–15 (page H–29), it is questionable that in the Powder River Region, productivity in an upland forest (8.0 tons/acre) is greater than that in a wetland/bottomland forest

(5.4). Also, it is difficult to believe that rangeland produces 6.7 tons per acre and pastureland only 1.7.

"Some of the productivity data in Table D–1 appear to be questionable. If, as indicated, productivities per acre/year in the Powder River Region (page D–2) are 5.4 tons for floodplains and higher than this for prairie (6.7), hardwood forest (5.8), and evergreen forest (8.0), then it seems as though unsuitability criteria should include more than just the floodplain type."

Commenter 121

Response. Tables H–15 and D–1 have been revised to reflect more accurate information.

23. **Comment.** "One transparently incorrect conclusion regarding environmental loadings from coal transportation is the assumption that coal slurry pipeline operations would not contribute to air emissions. See, for example, Tables H–65 on page H–84 and H–89 on page H–108. Although a pipeline is powered by electricity and may not visibly produce emissions along its line, generation of that electricity does cause air emissions. Moreover, these emissions are localized around power generation facilities. Failure to include emissions from electricity generation necessitated by slurry pipeline operation, distorts environmental impacts of the various modes of transportation.

"Based on those factors identified above, all estimates in this DES of air emissions from transportation as they relate to the Powder River Basin are suspect and should be given little weight. Regarding rail carriers, emissions factors from locomotive combustion are inaccurate, fuel consumption estimates are contradictory, unit train length was shortened and total coal to be transported is excessive. The bottom line is not a 'worst case' estimate of impact, but a totally improbable result."

Commenter 067

Response. The comment is that emissions from electric power generation needed to power pipelines should be considered in calculating air emissions resulting from coal slurry pipeline operations. This approach is not consistent with the analysis of residuals generated from fuel coal cycle. Air emissions from electric power plants are addressed separately and to recount them by end use categories will be double counting. The amount of total cost to be transported was based upon production numbers, and emission factors were derived from references 7 and 45 pages H–114 and H–115.

24. **Comment.**

The comment also quotes regional factors that are less than those reported in the environmental statement. It should be noted here that the factors are based on 10,000 capacity trains and are subject to a number of varied interrelated influences and they should be viewed as representative on a material basis rather than definitive.

Commenter 067

Response. The typical train air emissions listed on page H–34 are per train mile of travel. However, as shown in Table H–22 these emissions are for long-haul rail. Page H–34 will be corrected to reflect this. Also it should be indicated that those emissions were calculated from U.S. EPA 1976, Compilation of Air Pollutant Emissions Factors, Second Edition, AP–42, Research Triangle Park, N.C.

25. **Comment.** "Table H–22 is also subject to criticism because without very careful review it is highly misleading. It purports to compare air emissions from various modes of transportation but does not compare equal volumes of coal transported by each. Fuel consumption used for calculation of emissions is also inconsistent with relative energy consumption for the various modes stated on page 5–116. It stretches credibility that one mode of transportation which allegedly consumes the same Btus to transport a ton of coal as another mode (670 Btus for rail and 680 Btus for barge) suddenly consumes 2500 times the fuel volume per unit of coal transported (50 gallons of fuel to transport 10,000 tons one mile by rail versus 0.02 gallons of fuel to transport 10,000 tons one mile by tug)."

Commenter 067

Response. Table H–22 addresses air emissions from various modes of transportation in pounds/mile. These numbers were then converted to tons of pollutants per billion ton miles based on the weight of equipment and average distance transported. Then these factors were inputed to the model based on equal volumes of coal that agrees with your suggestion.

The calculations indicated for computing pollutants gives pounds of pollutants in the fuel,

and does not account for the oxygen in CO, NO_x, and SO_x or the uncombustible hydrocarbons.

26. **Comment.** "Paragraph H.5.1.3 Transportation, page H–34, states that typical train emissions have been estimated at 18.5 pounds of nitrogen oxides, 6.5 pounds of carbon monoxides, and 4.7 pounds of hydrocarbons per train mile of travel. Such casual use of national estimates does not provide a valid measure of locomotive emissions for a specific region. Fuel consumption and gaseous emissions are related to train speed, track grade, train load and many other operating conditions. This is particularly misleading when juxtaposed with the statement that transportation facilities are responsible for a large share of air pollutant emissions in many areas of the United States. This glib declaration begs the conclusion that rail carriers alone are responsible without help from automobiles, trucks, and other "transportation facilities.

"A more reasonable and logical measure relates gaseous emissions to fuel consumption. The following factors were provided by the manufacturer of the locomotive most likely to be used in unit train service in the Powder River Basin Region.

At a fuel consumption rate of 400 Btus per ton-mile, gaseous emissions from "long haul rail" would be as follows: 3.3 pounds of nitrogen oxides, 0.45 pounds of carbon monoxides, and 0.13 pounds of hydrocarbons per train mile of travel."

Commenter 067

Response. The values used in the analysis for train emissions are conservative. It is true that in certain cases lower emission values may be more suitable than those used.

27. **Comment.** "Four, regarding Tables H–90 and H–91 on the value of all agricultural products sold per acre of all land and the maximum agricultural opportunity costs of mining the figures and corresponding narrative are questionable. They reflect the typical BLM disregard for and undervaluing of the agricultural industry, which, in the long run, makes for a more easily justifiable resource trade-off. No mention is made anywhere in the statement of impacts to the livestock industry."

Commenter 174

Response. The values used to estimate opportunity costs of coal production, i.e., agricultural revenues foregone, represent the average of all agricultural revenues divided by all agricultural land acreage. Accordingly, the values utilized reflect the incorporation of high and low value crops and production. Included in these per-acre opportunity costs are the revenues generated by livestock production. Such an approach is used because it would be inherently biased to utilize only high value per acre crops in calculating such opportunity costs.

28. **Comment.** "The principal component of Chapter five's environmental assessment is the determination of environmental residuals which result from various coal production levels and patterns identified by the Department in Table 5–2 and Appendix H. These production projections are somehow derived from Department of Energy projections. The process for converting from DOE to DOI projections is entirely conjectural. Appendix H could not explain the basis of the conversion, and Departmental personnel were hard pressed to explain it in public meetings. One of the reasons for the adjustments is well justified—the inaccuracy of the DOE projections as described in these comments, *supra.* However, the adjustments do not reflect what we believe are rational attempts to correct DOE's errors. For example, Powder River production projections are untouched by DOI's adjustments, except for the 1985 High Powder River estimate, which is actually 70 million tons *higher* than DOE's estimate!

"Further comparing Tables 5–2 (DOE projections) and 2–29 (DOE estimates), we find that Interior's estimates for 1985 production *exceed* DOE's forecasts in five regions and throughout the West by 145 million tons (high level). In 1990, the DOI medium and high estimates each exceed DOE's in three regions and throughout the West by 94 million tons for the high level. When asked about these inconsistencies at the Denver, Colorado DES hearing, Departmental personnel indicated that the Coal Management Office had arbitrarily adjusted some of the projections in order to observe what would happen to the environmental impacts. Based on this explanation, we believe that the projections do *not* actually indicate the regional productions which could be expected under the preferred alternative, or for that matter, any other program. Hence, the environmental loadings which result from application of the Coal Impact

Estimates Program (CIEP) to these production projections do not represent the environmental impacts of the preferred program. Prior to analysis of the preferred alternative, the Department must more clearly explain the process of disaggregation and conversion beyond the description provided in H.2.2 to allow a more accurate picture of the actual regional production targets and thus the impacts resulting therefrom."

Commenter 097

Response. Section H.2.2 has been revised to present additional descriptive material concerning the disaggregation and derivation of coal production and consumption levels.

29. **Comment.** "Table I–1 shows reclamation costs to be $2,900/acre. Our experience at our San Juan Mine shows such costs to average approximately $5,200/acre. I suggest this table be revised through contacting the surface mine operators in the San Juan Basin.

"Table I–1. The heading on the right-hand column is wrong, It should not be "Total $/acre."

"Table I–3 gives an average dollar cost/ton of coal mined as 9¢ for reclamation. Our experience suggests this figure is 26¢ to 30¢ per ton. This table can also be easily revised through contacting the surface mine operators in the San Juan Basin."

Commenter 019, 041, 091

Response. The reclamation cost appendix has been eliminated from the FES due to data inaccuracies, prediction uncertainties, and the fact that this information is strictly economic and therefore not essential to an environmental impact statement.

8.3.8 LIST OF ALL WRITTEN COMMENTERS

All of the written comments that were received during the extended review period were given an index number and reviewed by the Department for substative comment on the draft programmatic environmental statement.

Written comments received after the 60 day review period were assigned to the environmental staff analysts for evaluation and for resultant changes or insertion in the text of the DES. However, no response was generated for these late comments. All of the comments have been recorded and are on file and available for public review at the Office of Coal Management, Bureau of Land Management, Room 3610, Washington, D.C. 20240. Below is a list of all respondents to the environmental statement, including the witnesses who appeared at the public hearings.

1. Southeast Nebraska Council of Governments
2. Natural Resources Council (Iowa)
3. BLM (730)
4. BLM (Oregon State Directors)
5. BLM (ESO)
6. Energy Transportation Systems, Inc.
7. BLM (Idaho State Director)
8. State of Utah, - Department of Development Services
9. David Rorick, Jr.
10. Intermountain Exploration Company
11. Natural Resources Council (Iowa)
12. Mr. Snyder
13. Ray Brady
14. North Dakota State Planning Division
15. BLM (ESO)
16. Department of the Interior - (HCRS)
17. Wallace McMartin
18. Sweetwater County Planning Department
19. Western Coal Company
20. BLM (DSC)
21. BLM (Montana State Director)
22. Eleanor C. Robbins
23. BLM (Nevada State Director)
24. BLM (Colorado State Director)
25. Friends of the Earth, Inc.
26. The Colorado Mountain Club
27. Friends of the Earth, Inc.
28. North Dakota State Planning Division
29. Bruce Seegert
30. Doris Ellis
31. T.W. Thursby
32. Edwina Eastman
33. BLM (TF-13)
34. Wesco Resources, Inc.
35. BLM (Utah State Director)
36. Intermountain Power Project
37. Mrs. Arthur Beier
38. Greg Flakers
39. Board of County Commissioners - Sheridan, Wyoming
40. Western Coal Company
41. USGS
42. High Country Citizens Alliance
43. M. Christopher
44. Bruce Seegert
45. Friends of the Earth, Inc.
46. North Dakota State Planning Division

47. Office of the Governor - State of Vermont
48. Department of the Treasury, BOGEO
49. Dwight Filley
50. HEW (EAG)
51. Governor's Office of Planning Coordination - State of Nevada
52. Russell L. Lipp
53. Charles W. Margolf
54. BLM (730)
55. Council of Energy Resources Tribes
56. Office of the Governor - State of Texas
57. DNA - Peoples Legal Services, Inc.
58. Public Lands Institute, Inc.
59. Western Colorado Resources Council, Inc.
60. Colorado Open Space Council
61. Northern Plains Resource Council
62. Powder River Basin Resource Council
63. Jean Rasager
64. Arizona State Clearinghouse
65. Central and South West Fuels, Inc.
66. Coastal States Energy Company
67. Burlington Northern
68. Consolidation Coal Company
69. Peabody Coal Company
70. Honorable Ken Kramer - U.S. House of Representatives
71. Environmental Information Center
72. BLM (New Mexico State Director)
73. Northern Minerals Company
74. CSG Exploration Company
75. MONTCO
76. League of Women Voters of the United States
77. AMAX Coal company
78. Utah Power and Light Company
79. Bureau of Mines
80. BLM (360)
81. Western Energy Company
82. Ad Hoc Committee on Public Body Leasing
83. Mobil Oil Corporation
84. Sunoco Energy Development Company
85. The Rio Grande Chapter of the Sierra Club
86. Katherine Moorehead
87. American Mining Congress
88. El Pasco Natural Gas Company
89. Natural Resources Defense Council, Inc.
90. Duncan, Brown, Weinberg, and Palmer, P.C.
91. Office of Surface Mining
92. The Carter Oil Company
93. Office of the Governor - State of Utah
94. The Cherokee and Pittsburg Coal Mining company
95. Southern California Edison Company
96. Tenneco Coal
97. Friends of the Earth
99. Environmental Policy Institute
100. Peter Kiewit Sons, Inc.
101. Colowyo Coal Company
102. American Mining Company
103. Council on Economic Priorities
104. James Catlin
105. Tri-County Ranchers Association
106. 3R Corporation
107. R Bar Ranch
108 Sierra Club - Northern Great Plains Office
109. The New Mexico Natural History Institute
110. Hames and Karen Bernhardt
111. The Illinois South Project, Inc.
112. Page T. Jenkins
113. Colorado River Board of California
114. Union Pacific Railroad Company
115. Department of Administration - State of Kansas
116. United States Department of Agriculture (SCS)
117. Federal Energy Regulatory Commission
118. Powder River Basin Resource Council
119. Pennsylvania State Clearing house
120. Cororado Westmoreland, Inc.
121. Office of the Governor - State of Montana
122. Office of the Governor - State of Wyoming
123. National Wildlife Federation
124. Environmental Defense Fund
125. Town of Guilford, Connecticut - Conservation Commission

Hearing Witnesses
Providing testimony

Salt Lake City, Utah

126. Clark Layton
127. William R. Bowen
128. Milton A. Oman
129. Loren E. Williams
130. Gordon Anderson
131. Gary Tomsic
132. R. J. Bowen
133. John Bell
134. Nina Dougherty

Albuquerque, New Mexico

135. George Byers
136. John Tilten
137. Paul Robinson
138. Joseph Gmuca
139. Judson C. Kelly
140. David Glowka
141. L. C. Edwards
142. Ken Brim
143. Jack Kennedy

Casper, Wyoming

144. Sarah Gorin
145. Bob Anderson
146. Reed Zars
147. Al Minier
148. Bruce Hamilton
149. Richard Andrews
150. Frederick Murray

Craig, Colorado

151. Ken Norris
152. Daniel R. Ellison
153. Bill Gossard

Denver, Colorado

154. Carolyn Ruth Johnson
155. Harris Sherman
156. Kenen Markey
157. Annee Vickery
158. Brad Klafehn
159. Terry O'Connor
160. Steven Moore
161. Lynn Burns
162. Jerry Whiting
163. Traver Berrington
164. Linda Lindsey
165. Steve Wolcott
166. Robin Nicholoff
167. Gratchen Nicholoff
168. Mark Welsh
169. Carolyn R. Johnson

Billings, Montana

170. Governor Tim Judge
171. Jean Anderson
172. Bill Mackay
173. Harvey Bieber
174. Henen Waller
175. Douglas Richardson
176. Mary Daniels
177. Patty Kluver
178. Dr. Daniel Henning
179. Keith Williams
180. Bertha Medicine Bow
181. Edward Dobson

Bismarck, North Dakota

182. Ruben Hummel
183. Gust Mittelstedt
184. Dwight Connor
185. Evelyn Newton
186. Bruce Hagen
187. Ted Nace
188. Randolph Nodland
189. June Thompson
190. Dale Nabben

Washington, D.C.

191. Carey Ridder
192. Lamont C. Laue
193. David Masselli
194. Kevin L. Markey
195. Jonathan Lash
196. Robert L. Sansom
197. Daniel J. Snyder, III
198. Roger E. Nelson

NOTE: The following witnesses presented oral testimony that was not typed on the original copy of the court transcript due to an error in transcribing. Hence, the index numbers are out of sequence.

202 Susan Westfall

NOTE: Witness names listed below did not present oral testimony but submitted written comments at the following locations

Denver

199. Claire Moore
200. Nancy Strong
201. Paul Murrill

Bismarck

203. Vern Fahy
204. Ken Ziegler

(No witness testimony presented at the scheduled hearings in Chicago, Illinois, or Lexington, Kentucky).

Late Comments

205. Denver Service Center
206. Joanne Dunnebecke
207. Holland & Hart
208. Utah International
209. Edison Electric Institute
210. Getty Oil Company
211. Sierra Club - Utah Chapter
212. Pacific Gas and Electric Company
213. Edison Electric Institute
214. Northern Cheyenne Research Project
215. Dwayne Ward
216. The Wilderness Society
217. Sierra Club - Pennsylvania Chapter
218. Theodore K. Nace
219. Thomas Breitback
220. Atlantic Richfield Company

221. BLM (TD)
222. Intergovernmental Relations Division
223. Wilderness Study Committee
224. GRC Exploration Company
225. Oklahoma State Clearinghouse
226. Rocky Mountain Energy Corporation
227. Ranchers Energy Corporation
228. Kenneth E. Joel
229. Peter Kiewit & Sons, Inc.
230. Charles W. Margolf
231. McCone Agricultural Protection Organization
232. Walter Swain
233. Graduate Students, Environmental Studies Program, University of Montana
234. Charles Worley
235. Western Energy Company
236. Wyoming Outdoor Council
237. Cecil H. Smith
238. Energy and Environmental Analysis, Inc.
239. Department of Finance Administration - State of New Mexico
240. National Park Service
241. Henry Peck
242. Kansas City Power and Light Company
243. Texas Historical Commission
244. City of Gillette, Wyoming
245. Game and Fish Department - State and Wyoming
246. Department of Natural Resources - State of Colorado
247. Northern Cheyenne Research Project
248. Kansas City Power and Light Company
249. Texaco, Inc.
250. Bruce Berger
251. Claire Kearney Gailbraith
252. Connie Ohman
253. Henry Peck
254. Missouri River Basin Commission
255. April L. Sanders
256. Department of Commerce
257. Union Pacific Railroad Company
258. Arizona Office of Economic Planning and Development
259. North Carolina Department of Administration
260. Commonwealth of Virginia-Council on the Environment
261. New Mexico State Clearing House
262. Tom Snyder
263. North Dakota Game and Fish Department
264. State of Montana-Department of Agriculture
265. Commonwealth of Kentucky-Department of Natural Resources
266. Fish and Wildlife Service, Colorado-Utah office
267. Colorado Department of Natural Resources
268. North Dakota State Historical Society
269. Southwest Research and Information Center
270. Burgess and Davis, Esq.
271. State of Washington-Office of Financial Management
272. State of Illinois-Bureau of the Budget
273. Department of the Army-Office of the Chief of Engineers
274. Arizona Department of Transportation
275. New Mexico Wilderness Study Committee
276. Colorado Division of Planning
277. Florida Department of Administration
278. Holland and Hart, Esq.
279. Charles David Parent
280. Arizona Office of Economic Planning and Development
281. Environmental Protection Agency
282. Forest Service, Department of Agriculture
283. Office of the Governor-State of Alaska
284. Office of the Governor-State of South Dakota
285. The Resources Agency of California
286. Office of Economic Planning and Development
287. Director, Fish and Wildlife Service, Department of the Interior Environmental Protection

8.4 REFERENCES

1. U.S. Department of the Interior, 1975. Final Environmental Impact Statement Proposed Federal Coal Leasing Program. Bureau of Land Management, Washington, D.C.

2. U.S. Department of the Interior, 1978. The Format Outline for Coal Programmatic DES. 43 Federal Register 147: 33348–33349.

TABLE 8-1

ORGANIZATIONS CONSULTED DURING PREPARATION OF THIS STATEMENT

FEDERAL GOVERNMENT AGENCIES

Advisory Council on Historic Preservation
  Office of the General Counsel
Department of Agriculture
  Division of Forestry, Forest Sciences Laboratory, Logan, Utah
  Economic Research Service
  Forest Service
  Land Inventory and Monitoring Division
  Livestock and Range Research Station, Miles City, Montana
  Northeast Forest Experiment Station, Berea, Kentucky
Department of Commerce
  Bureau of the Census, Population Division
  Bureau of Economic Analysis
  Economic Development Administration
Department of Energy
  Argonne National Laboratory, Land Reclamation Office
  Division of Coal
  Division of Petroleum and Natural Gas
  Division of Non-Ferrous Metals
  Federal Energy Regulatory Commission
  Leasing Policy Development Office
U.S. Department of Health, Education, and Welfare
  Health Resources Administration
  National Institute of Occupational Safety and Health
Department of the Interior
  Bureau of Land Management, Office of Coal Management
  Heritage Conservation and Recreation Service, National Register Office; National Landmarks Group; Interagency Archaeological Services
  Geological Survey
  Office of Surface Mining
  Bureau of Mines
Department of Justice
  Law Enforcement Assistance Administration
Department of Labor
  Bureau of Labor Statistics, Wholesale Price Index Division
  Mine Safety and Health Administration
Department of Transportation
  Federal Railroad Administration

TABLE 8-1 (Continued)

Environmental Protection Agency
Municipal Operations Branch
Region IX
Interstate Commerce Commission
Water Resources Council

STATE AND LOCAL GOVERNMENTS

Alabama Division of State Parks
Alabama Forestry Commission
Arizona State Parks
Arkansas Department of Parks and Tourism
California Air Resources Council
Colorado Air Pollution Control Board
Colorado Department of Natural Resources
Division of Mine Land Reclamation
Division of Parks and Outdoor Recreation
Georgia Department of Natural Resources
Parks and Historical Sites Division
Idaho Department of Parks and Recreation
Illinois Department of Conservation
Illinois Department of Mines and Minerals
Land Reclamation Division
Indiana Department of Natural Resources
Division of State Parks
Iowa Department of Soil Conservation
Division of Mines and Minerals
Iowa State Conservation Commission
Iowa State University
Kansas Foresty, Fish and Game Commission
Kansas State Park and Resources Authority
Kentucky Air Pollution Control Board
Kentucky Division of Parks
Louisiana Department of Wildlife and Fisheries
Louisiana State Park and Recreation Commission
Missouri Department of Conservation
Forestry Division
Missouri Department of Natural Resources
Division of Parks and Recreation
Land Reclamation Program
Montana Department of Fish and Game
Recreation and Parks Division
Montana Department of State Lands
Reclamation Division

Nebraska Game and Parks Commission
New Mexico Bureau of Mines and Mineral Resources
New Mexico State Park and Recreation Commission
North Dakota Park Service
North Dakota Public Service Commission
Ohio Department of Parks and Recreation
Division of Natural Resources
Oklahoma Department of Mines
Oklahoma Department of Wildlife Conservation
Oklahoma Division of State Parks
Pennsylvania Department of Environmental Resources
Bureau of State Parks
South Dakota Department of Game, Fish and Parks
Division of Parks and Recreation
State Council of Governments
Tennessee Department of Conservation
Division of State Parks
Texas Forest Service
Texas Parks and Wildlife Department
Parks Division
Texas Railroad Commission
Surface Mining Department
Utah Department of Natural Sources
Oil, Gas, and Mining Division
Division of Parks and Recreation
Division of Wildlife Resources
Utah State Forester Office
Virginia Department of Conservation and Economic Development
Division of Parks
West Virginia Department of Natural Resources
Division of Parks and Recreation
West Virginia University
School of Forestry
Western Interstate Energy Board
Wyoming Department of Environmental Quality
Land Quality Division
Wyoming Department of Revenue and Taxation
Wyoming Game and Fish Department
Wyoming Recreation Commission

INDUSTRY

American Mining Congress
Bituminous Coal Operators' Association
Burlington Northern Railroad
Chicago and North Western Transportation Company
Kemmerer Coal Company

TABLE 8-1 (Concluded)

National Coal Association
Utah Power and Light Company

PRIVATE INDIVIDUALS AND ORGANIZATIONS

Geraghty and Miller, Incorporated
Hunter, Tom
Jansen, Dr. Ivan J.
Los Alamos Scientific Laboratory
National Geographic Society
Schiff, Dr. Daniel
Society of American Foresters

TABLE 8-2

FEDERAL AGENCIES REQUESTED TO COMMENT ON THE DRAFT ENVIRONMENTAL STATEMENT

Advisory Council on Historic Preservation
Appalachian Regional Commission
Council on Environmental Quality
Department of Agriculture
  Soil Conservation Service
  Forest Service
Department of Commerce
Department of Defense
  Army Corps of Engineers
Department of Energy
Department of Health, Education, and Welfare
Department of Housing and Urban Development
Department of the Interior
  Bureau of Mines
  Bureau of Indian Affairs
  Bureau of Reclamation
  Fish and Wildlife Service
  Geological Survey
  Heritage Conservation and Recreation Service
  National Park Service
  Office of Surface Mining
Department of Labor
  Mining Safety and Health Administration
  Occupational Safety and Health Administration
Department of State
Environmental Protection Agency
Federal Trade Commission
General Services Administration
Interstate Commerce Commission
National Aeronautics and Space Administration
National Science Foundation
Nuclear Regulatory Commission

TABLE 8-3

PUBLIC HEARINGS

January 22, 1979

Salt Lake City, Utah

Steve Freudenthal, Deputy Under Secretary
Paul Howard, BLM State Director, Utah
Monte Jordan, Chief, Coal Program Development Staff

Albuquerque, New Mexico

John Van der Walker, Special Assistant to Director, Office of Coal Leasing, Planning and Coordination
Bob Moore, Asst. to Director, Office of Coal Management

January 23, 1979

Casper, Wyoming

Steve Freudenthal
Barbara Heller, Deputy Under Secretary
Monte Jordan
Delmar Vail, BLM Associate State Director, Wyoming

Craig, Colordao

Leo M. Krulitz, Solicitor
Bob Moore
Dale Andrus, BLM State Director, Colorado

January 24, 1979

Denver, Colorado

Leo M. Krulitz
John Van der Walker
Bob Moore
Dale Andrus

Billings, Montana

Frank Gregg, Director, Bureau of Land Management
Chuck Rech, Deputy Director, Office of Coal Leasing, Planning and Coordination
Monte Jordan
Ed Zaidlicz, BLM State Director, Montana

TABLE 8-3 (Concluded)

PUBLIC HEARINGS

January 25, 1979

Bismarck, North Dakota

Chuck Rech
Monte Jordan
Ed Zaidlicz

January 30, 1979

Chicago, Illinois

Leo M. Krulitz,
Steve Quarles, Director, Office of Coal Leasing, Planning and Coordination
Bob Moore
Claude Martin, BLM Associate State Director, Eastern States Office

February 1, 1979

Lexington, Kentucky

Guy Martin, Assistant Secretary
Barbara Heller
Steve Quarles
Claude Martin

February 6, 1979

Washington, D.C.

Steve Quarles
Bob Uram, Assistant Solicitor
Bob Moore
Lowell Udy, BLM State Director Eastern States Office
Monte Jordan

APPENDIX A

EXAMPLE REGULATIONS

[4310-84-M]

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[43 CFR Group 3400]

COAL MANAGEMENT

AGENCY: Bureau of Land Management, Interior.

ACTION: Proposed rulemaking.

SUMMARY: The proposed rulemaking sets out the procedures the Secretary of the Interior proposes to use in carrying out the authority granted him to manage Federally-owned coal through leasing or exchange under the provisions of the Mineral Leasing Act of 1920, as amended; the Mineral Leasing Act for Acquired Lands, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act and other related Acts. These procedures are to be carried out in a manner that will afford protection for the environment.

DATE: Comments by May 18, 1979. Only those comments received by the above date will be considered.

ADDRESS: Comments are to be sent to: Director (210), Bureau of Land Management, 1800 C Street, N.W., Washington, D.C. 20240. Comments will be available for public review in Room 5555 of the above address during regular working hours (7:45 a.m.-4:15 p.m.) Monday through Friday.

FOR FURTHER INFORMATION CONTACT:

Don Mitchell, 202-343-4537, or Robert C. Bruce, 202-343-8735.

SUPPLEMENTARY INFORMATION: This proposed rulemaking is designed to establish the procedures that the Secretary of the Interior will use to carry out his authority to manage Federal coal, through leasing or exchanging of coal interests and other actions. This authority is granted under the provisions of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.); the Mineral Leasing Act for Acquired Lands, as amended (30 U.S.C. 351 et seq.); the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.); the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.); the Multiple Mineral Development Act (30 U.S.C. 521 et seq.); and the Department of Energy Organization Act (42 U.S.C. 7191 et seq.). These procedures are to be carried out in a manner that will afford protection for the environment.

This proposed rulemaking consolidates all regulations concerning the management of coal in a new Group 3400 in Title 43. At the present time, coal is handled in the same manner as other leasable minerals (except oil and gas) and is covered by the provisions of Part 3500 of Title 43 of the Code of Federal Regulations. Because of the special considerations required in the disposal of coal in recently enacted legislation, it was decided that the coal program of the Department of the Interior needed special handling and all references to coal should be removed from Part 3500 and placed in a new group that addresses coal exclusively. In addition, Part 3500 will be rewritten to eliminate all references to coal and to make Part 3500 easier to read and understand.

This proposed rulemaking is a further step by the Department of the Interior in carrying forward a new Federal coal management program. This new program was initiated in response to the President's May 23, 1977, Environmental Message; the President's May 24, 1977, direction to the Secretary of the Interior to establish and implement an environmentally-sound comprehensive Federal coal management program; and the President's Energy Plan of April 29, 1977, which stressed the need to increase national coal production to meet the Nation's growing energy needs while diminishing its dependence on imported oil and gas. The statutory base for coal management has been altered substantially over the last three years by the passage of the Federal Coal Leasing Amendments Act of 1976, the Federal Land Policy and Management Act of 1976, the Surface Mining Control and Reclamation Act of 1977, the Department of Energy Organization Act of 1977, and the Federal Coal Leasing Amendments of 1978. This new statutory and program direction is reflected in the proposed rulemaking.

On September 27, 1977 in *NRDC* v. *Hughes*, 437 F. Supp. 981 (DCC 1977), modified 454 F. Supp. 148 (DDC 1978) it was held that the 1975 final environmental statement on a proposed Federal coal management program (termed Energy Minerals Activity Recommendation System (EMARS)) was inadequate. The accompanying order required the Department of the Interior to prepare a supplement to that environmental statement which would address certain coal management issues. The Secretary chose not to simply publish a supplement but instead to develop a new program responsive to the many statutory changes and new program directions which had been made since the filing of the 1975 statement. As a result, an entirely new draft environmental statement was issued on December 15, 1978, which addresses a new preferred alternative coal management program.

In that environmental statement, as appendix A, was a set of example regulations for the preferred alternative. As a first step in the rulemaking process, the Department of the Interior published a notice of intent to propose rulemaking in the FEDERAL REGISTER of December 15, 1978 (43 FR 58776), which requested comments on the example rulemaking in the draft environmental statement. The notice of intent requested comments by February 13, 1979, but a later notice made it clear that any comments received prior to publication of the proposed rulemaking would be considered.

As a result of the notice of intent to propose rulemaking, the Department of the Interior received 22 written comments. Six of the comments were from mining companies, four were from Federal agencies, seven were from interest groups, with three representing industry interest groups and four representing environmental interest groups, one comment was from a State governmental agency and four were from private individuals. Oral comments were received at hearings and meetings held on the environmental statement. In addition, written comments submitted on the draft environmental statement after close of the comment period, to the extent they were relevant, were treated as comments on the notice of intent to propose rulemaking. Each of the written comments and all of the oral comments received were carefully considered during the preparation of the proposed rulemaking and are discussed as part of this preamble.

Subpart 3400 contains material that applies generally to all the subparts of the proposed Group 3400. It contains: Citations to the statutory authorities exercised in promulgating this proposed rulemaking; a division of responsibilities among the agencies in the Department of the Interior that have a role in managing Federal coal; definitions of the terms used throughout Group 3400; a statement of the Federal lands that are subject to the provisions of the group, especially the leasing provisions of Group 3400; and a description of the membership and functions of the regional coal teams that have a central role in administering the provisions of Group 3400.

The authorities section lists all statutes that are significant sources of authority for the proposed rulemaking. Each subsequent subpart of the proposed rulemaking contains a reference to this general list and notes a specific statute or section of a statute only if that subpart chiefly implements or is chiefly derived from that authority. The example regulations carried the

authorities cited in the existing Group 3500 regulations into each of its subparts, with the addition of authorities that did not exist when the coal regulations were last revised in 1976. The proposed rulemaking alters only the format of the example rulemaking, as indicated above. No comments were received on the authorities section of the example rulemaking. The responsibilities section was not in the existing Group 3500 regulations. The surface management regulations for mining operations (43 CFR Subpart 3041, May 17, 1977) contain some of the material, but their scope is not as broad and the passage of the Surface Mining Control and Reclamation Act changed much of those regulations.

The responsibilities section appeared for the first time in the example rulemaking and is carried forward into the proposed rulemaking with several changes. One noteworthy change in section 3400.04 is the qualification in section 0-4(a)(1) that makes it clear than only the Office of Surface Mining Reclamation and Enforcement will formally designate lands unsuitable for mining operations under section 522(c) of the Surface Mining Control and Reclamation Act. In addition, section 0-4(c)(6) was added to ensure the inclusion of the Office of Surface Mining Reclamation and Enforcement's role as the negotiator of cooperative agreements with the States on State enforcement of reclamation laws on federal lease operations under section 523(c) of the Surface Mining Control and Reclamation Act.

Two comments were offered on the responsibilities section of the example rulemaking. The first comment suggested that the Fish and Wildlife Service could not carry out its responsibilities under the rulemaking unless it had the authority to designate lands unsuitable for coal development rather than simply recommending lands as unsuitable. The Secretary of the Interior by authorization of the Surface Mining Control and Reclamation Act has delegated the authority to designate lands as unsuitable to the Office of Surface Mining Reclamation and Enforcement.

The agency making the unsuitability determination will give careful consideration to the recommendations of the Fish and Wildlife Service prior to making its final decision.

A second comment on the responsibilities section recommended that the Bureau of Land Management be required to obtain the concurrence of the land owner, if it is someone other than the Federal Government, before determining an appropriate postmining land use of surface-mined lands. Postmining land use is determined through the Bureau of Land Management's land use planning process, reaffirmed at time of lease offering, and again during review of the mining and reclamation permit application. Where private surface overlays Federal coal, the surface owner's choice of postmining land use is given the highest priority, subject to provisions of the Surface Mining Control and Reclamation Act (See 30 CFR 780.23, 816.131) and mitigating measures during the environmental assessment process under the National Environmental Policy Act of 1969. No changes were made in the proposed rulemaking as a result of the comments offered. In fact, the proposed rulemaking requires surface owner approval of any land use substantially different from the premining land use (§ 3465.4).

The terms in the definitions section were drawn from all subparts of the present Group 3500 regulations. These were substantially supplemented by definitions in the example rulemaking to incorporate terms introduced by new legislation as well as to clarify existing usage. The proposed rulemaking is even more inclusive in an attempt to make the use of terms in each subpart of the proposed rulemaking consistent and to reduce ambiguity and confusion. To make the usage consistent throughout the new Group 3400, new definitions were added to those in the example regulations for the following terms: Bypass coal; compliance bond; Federal lands; lease; licensee; and license to mine. The definition of commercial quantities in § 3400.0-5(i) was corrected from the example regulations—subsection (i)(2) was changed from "lease issued *after* August 4, 1976," to "lease issued *before* August 4, 1976".

Definitions relating to functions of the Office of Surface Mining Reclamation and Enforcement or terms that apply to mining operations on private lands and the Federal lands review are intended to be the same as those contained in the permanent program regulations of the Office of Surface Mining Reclamation and Enforcement. The timing of the publication of that agency's final rulemaking and this proposed rulemaking has made it difficult to assure that all definitions are identical in substance, if not in wording. Any discrepancies between the definitions and other aspects of the two rulemakings will be resolved in the preparation of the final rulemaking for this program.

Several comments were directed to the definitions section of the example rulemaking. One comment suggested that the definition of the term "fair market value" include not only the bonus payment but also rentals and royalties. The comment pointed out that the higher royalties have the effect of lowering the bonus in a fair market value estimate. After careful consideration, a minor change was made in the definition of the term "fair market value".

The definition of the term "logical mining unit" drew two comments that asked for a change in the 25,000 acre limitation and the 40 year limitation incorporated in the definition. These limitations are statutorily imposed and cannot be changed.

A comment suggested changes in the definition of the term "maximum economic recovery". Even though the comment was considered and no change was made in the definition, the Department of the Interior solicits comments on whether the term should be redefined to use the marginal cost and the marginal revenue of all seams, to use strictly the average cost and average revenue of all seams, or to use some other definition. Under the present definition, a lessee will mine those seams which can be collectively extracted at a normal level of profit with consideration given to social and economic costs.

An interagency task force is presently considering the methods employed by the Department in determining fair market value and the proposal for determining maximum economic recovery. The task force report will be submitted in April, will be made public, and will be considered by the Secretary when he renders his decision on these proposed regulations.

Finally, a comment on the definition of the term "written consent" suggested that the term "negative consent" should also be defined. This comment has not been adopted because the refusal to give consent process is fully described in §§ 3420.2-3 and 3420.6 of the proposed rulemaking.

Sections 3400.1 through 3400.3 are derived from the coal related provisions of the existing Subparts 3500 and 3501. These sections are the focus of two comments. The first comment indicated that § 3400.3-1 was in conflict with § 3420.2-5. An analysis of the two sections did not disclose any such conflict and no changes have been made in either of the two sections of the proposed rulemaking.

A second comment from the same source requested changes in § 3400.3-3 of the example rulemaking. The first change would require the Secretary of Ariculture to make a formal finding for decisions under § 3400.3-3(b)(2). The second change was to provide some method of appeal or protest within the Department of the Interior, when it is alleged that the finding cannot be sustained. The comment also suggested that a possible alternative way of achieving the same result—providing for a review of the facts in contention when the decision is made by another agency—might be to allow the Department of the Interior to

lease under these conditions only when such leasing is in accord with a land use plan developed under the National Forest Management Act, thereby allowing the issue to be contested under the Department of Agriculture's planning rules. The change proposed in the comment has not been adopted because the Secretary of Agriculture essentially makes a formal finding under § 3400.3-3(b)(2) when potential coal leasing is found compatible with other uses during the Forest Service land use planning process under the provisions of the National Forest Management Act. Also, the Department of the Interior affords the right of appeal to any party adversely affected by a decision of an officer of the Bureau of Land Management or an Administrative Law Judge. The Department of Agriculture has a similar appeals procedure. In addition, (1) a person adversely affected by a decision to lease for surface mining can submit a petition to have lands classified as unsuitable for surface mining, and (2) any decision to lease coal, whether for surface mining on National Forest lands or otherwise, is automatically subject to environmental assessment, not only through the land use planning process, but also through the requirements of the National Environmental Policy Act of 1969 and Council on Environmental Quality regulations in 40 CFR Part 1500.

Section 3400.4 of the proposed rulemaking was not in either the existing Group 3500 regulations or in the example rulemaking. This set of sections proposes to establish regional terms that will be central to the administration of the new coal program. This proposal formalizes the Department's commitment of close Department-State relations in administering program functions and the Department's commitment to conduct its coal management decisionmaking in a manner which ensures that it considers all cumulative region-wide impacts of its decisions. The regional coal teams' functions are found in the substantive provisions of the proposed rulemaking. Since this is an entirely new section, no comments were received on it and the public is asked to be particularly alert to these provisions when making comments on the proposed rulemaking. The proposed regions will be set out in the final environmental impact statement and in an appendix to this notice. Comments are specifically requested on these proposed regions.

Subpart 3410 governs all pre-lease exploration activity for coal for commercial purposes on Federal lands. The provisions of the proposed rulemaking are primarily taken from Subpart 3507 of the existing regulations. These were established in January 1977 to implement the Federal Coal Leasing Amendments Act of 1976 which repealed the former prospecting permit system of coal exploration on public lands. The proposed rulemaking is carried over from the example rulemaking with some changes: The sections have been reordered so that the rulemaking follows the chronology of the licensing process; and provisions has been made for publishing the notice soliciting participants in the exploration upon the filing of an application for a license. The latter change should expedite license issuance; participants will be solicited while the exploration plan is being reviewed and approved, not afterwards.

In addition, § 3410.3-4(c) was added concerning exploration for Federal coal on split estate lands where the surface is under private ownership (whether or not the owner is qualified for the purpose of consent for leasing).

Three different comments were received on this subpart of the example rulemaking. One comment of a general nature on exploration licenses suggested that an exploration license granted by the Bureau of Land Management would be duplicative of exploration permits authorized by the Surface Mining Control and Reclamation Act. The only licenses to explore for coal on unleased public lands will be those authorized under this subpart.

A comment on § 3410.2-1 of the example rulemaking, which has been renumbered § 3410.2-2 in the proposed rulemaking, suggested that wording be included that would require consultation with the U.S. Geological Survey in the assessment of the potential effect of a coal exploration program on an area and its environment. This comment was adopted.

Another comment recommended that § 3410.2-1 of the example rulemaking, which has been renumbered § 3410.2-2 in the proposed rulemaking, be deleted since it appears to be unnecessary. The comment suggested that an environmental statement should not be considered for an exploration license because exploration is only an information gathering activity and information gathering activity is permitted only if there is no substantial disturbance. Presently, an environmental statement will be done only when it is required under section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)). The section has been retained, but the Department proposes to request a categorical exclusion for the issuance of exploration licenses from the environmental statement requirements of the National Environmental Policy Act under the regulations of the Council on Environmental Quality (40 CFR 1508.4, 43 FR 56003). This exclusion is being requested because exploration under a license is not supposed to cause substantial disturbance to the natural land surface.

A second comment from the same source recommended that the Bureau of Land Management, rather than the applicant, publish the Notice of Invitation which the proposed rulemaking requires. This suggestion was based on the fact that the applicant received no preference right in return for the exploration data received at little or no cost to the Federal Government. Since the exploration licenses yield no revenue to the Federal Government, the costs involved in an exploration permit should be borne by the applicant.

A final comment on Subpart 3410 of the example rulemaking suggested that exploration results obtained under a license may need to be held confidential even after an area has been leased where other private holdings are at issue or surface owner consent negotiations with the Government may be taking place. The suggested change was not adopted because it would be inconsistent with the Federal Coal Leasing Amendments Act.

The Department of the Interior has been informed that some coal exploration is done in the guise of uranium exploration, since the two minerals may both be identified by identical methods and both may reasonably be thought to underlie the same lands. Coal exploration for commerical purposes without an exploration license constitutes trespass against the United States. To assist in administering the law, the Department solicits comments on how widespread such a practice might be and how the Department might best act to prevent this trespass, and to acquire the data respecting Federal coal deposits Congress intended it should have to administer a coal management program.

Subpart 3420 contains the general competitive coal leasing provisions that are proposed to replace the Energy Mineral Activity Recommendation System (EMARS) now in Subpart 3535 of existing regulations. The enforcement of EMARS as enjoined by the U.S. District Court for the District of Columbia in *NRDC* v. *Hughes*, 437 F. Supp. 981 (D.D.C. 1977), modified, 454 F. Supp. 148 (D.D.C. 1978). This new leasing process is set out as an integral part of the preferred alternative in the Draft Environmental Statement on the Federal Coal Management Program, and is discussed at greater length there. The example rulemaking sets out the chronology of the land use planning and activity planning process that would be completed before a competitive lease sale. The provisions of §§ 3420.1 through 3420.1-5 prescribe the screening steps that must be completed in the proce-

dure before lands can be considered acceptable for further consideration for leasing. Section 3420.1-5 requires that a land use plan, or under certain circumstances, a land use analysis, be conducted for Federal lands before an area can be considered for lease sale.

The land use plan requirement in § 3420.1-5 has been clarified to establish more clearly what organizational unit is chiefly responsible for the completion of land use plans on what lands, and to clarify the Secretary's authority, in the absence of a Federal agency plan or in the absence of a relevant State plan, to conduct a land use analysis. The revision is designed both to clarify the importance of a completed land use plan (or land use analysis) as a statutory prerequisite to leasing, and to conform this proposal to the proposed Bureau of Land Management planning regulations for Group 1600 of Title 43 (43 FR 53764-58774).

The provisions of §§ 3420.2 through 3420.2—7 describe the land use planning process necessary on lands administered by the Bureau of Land Management before those lands will be considered acceptable for further consideration for leasing; this process is conducted as an integral part of Bureau-wide land use planning, but specific steps must be taken during planning to screen lands that should be considered during coal activity planning. Section 3420.2-3 sets out the screening that is to be applied to all coal-bearing lands during the land use planning. The high and medium coal development potential and surface owner consultation screening processes have been modified from those contained in the example rulemaking. Just as § 3420.1-5 was revised to make it consistent with the proposed group 1600 rulemaking, § 3420.2, governing coal-related land use planning required before an area will be identified as acceptable for further consideration for leasing, was also revised in some respects. The requirements in this section would not supersede or modify any requirements of the proposed group 1600 rulemaking, and are intended to be fully consistent with them. The texts of § 3420.1-5 and the sections under § 3420.2 dealing with land use planning are not verbatim copies of the group 1600 rulemaking. Additional text has been added in order to specify the details that will be required in land use plans to be prepared under the procedures of the Group 1600 rulemaking for lands containing coal deposits subject to leasing.

The Bureau of Land Management has chosen to repeat certain provisions, such as requirement for consultation with qualified surface owners in section 714(d) of the Surface Mining Reclamation and Enforcement Act, in both the proposed land use planning rulemaking and this proposed rulemaking (43 CFR 1601.3(f), and 3420.2-2(d)) rather than raise a question as to their omission from a prominent place in either the land use planning process or the coal management program. The consultation process is unchanged by the dual reference. The Bureau of Land Management will closely coordinate its review of the related comments on the two proposed rulemakings, and will closely coordinate the drafting of final rules to avoid any inconsistency between the two sets of final rulemakings.

A new subsection has been added to the initial land use planning screening procedure where all but high and medium coal potential lands are screened out from further consideration for leasing. The subsection would assure that companies and the public have the opportunity to submit information on the coal resource, and that this screen is applied with the broadest possible data available to the land use planners. This valuable resource information gathering step is not, however, a call for expressions of leasing interest, but an opportunity to submit coal resource data.

The public is asked to give careful consideration to the provisions for consultation in the land use planning process and the impact that the nonmining preference can have on land use planning. The use of the firm intent not to provide consent disclosure and its impact on the management program is an area on which comment is specifically requested (see discussion of firm intent disclosure in preamble discussion of Subpart 3427).

The provisions of § 3420.3 through § 3420.3-4 contain an element absent from EMARS: The establishment of regional leasing targets to guide the post-land use planning coal management decisionmaking. This group of sections has been revised in the proposed rulemaking in these major respects: (1) It now shows more explicitly and directly how the leasing target setting process is tied to the Department of Energy's national coal production goals, and the Memorandum of Understanding between the Department of the Interior and the Department of Energy on setting and using those national goals; (2) it establishes the distinction between regional coal production goals generally and the Department of the Interior's regional leasing targets—the amount of coal, both Federal and non-Federal able to be developed only in conjunction with Federal coal, that the Department of the Interior will consider readying for production in its current four-year competitive leasing cycle; and (3) it describes the role of the regional coal team in the process of setting regional leasing targets.

The provisions of §§ 3420.4 through 3420.4-6 set out the activity planning (as oposed to land use planning) steps. This is the process for selecting tracts for leasing and exchange of coal interests from lands that have been identified in the land use plans, after the land use planning screening has been fully applied, as areas acceptable for further consideration for leasing. Each discrete step is set out in §§ 3420.4 through 3420.4-6: calls for expression of leasing interest; tract delineation, the physical description of the lands and coal seams that could become a mine; tract ranking, comparing all delineated tracts in a region; tract selection, determining how many and which highly ranked tracts should be sold to meet the regional leasing target; and sale scheduling, timing the sale of the selected tracts over the four-year sale cycle. The proposed rulemaking is different from the example rulemaking chiefly in the establishment of the role of the regional coal team as the central actor in this process.

The proposed rulemaking also requires the preparation of a "tract profile" in the tract delineation process (§ 3420.4-3(f)), to assist the team in tract ranking, selection and scheduling. Section 3420.4-4, which sets out the regional tract ranking, selection and scheduling procedures, has been expanded to discuss the formulation of *alternative* sales schedules as an integral part of this process. The process includes the preparation of a regional sale environmental statement that will formally discuss the results of the process and alternatives.

The example and proposed rulemakings differ signficantly from the EMARS regulations in that the Department's call for expressions of leasing interest from coal companies, utilities and others is issued as the first step in the tract delineation process after land use planning is completed. In the EMARS process, this step preceded land use planning and was the driving force in determining what lands would be leased; in the preferred alternative, expressions of interest can be filed only for land already identified in the land use planning process as acceptable for further consideration for leasing.

In sections of § 3420.2 through 3420.2-7, 3420.3 through 3420.3-4 and 3420.4 through 3420.4-6 described above, the successive steps in the land use planning, leasing target setting and activity planning processes are designed to complement each other once the program, if adopted, is fully implemented. The latter two processes will continue on regular cycles, using areas found to be acceptable for further consideration for leasing in the on-going Bureau-wide land use planning effort.

If the program is adopted and if leasing is needed before the first four year regional lease sale schedules could be set using the full step-by-step process, the Department proposes these start-up considerations.

First, the land use planning section, expressly provides that an already completed land use plan (or management framework plan, under current Bureau usage), is an adequate basis for determining the acceptability of lands for further consideration for leasing, as long as it is formally supplemented by the application of the lands unsuitable and surface owner consultation screens set out in proposed § 3420.2-3. Thus the absence of final land use planning regulations under the proposed rulemaking for group 1600, or land use plans formally revised in conformity with those rules after they are final is not a bar to coal activity planning and the issuance of a coal lease, just as it has not been for coal or other resources—forage, timber, wilderness—since the enactment of the Federal Land Policy and Management Act in October 1976. Both the Federal Land Policy and Management Act, as well as the proposed land use planning regulations for each, specifically provide for continued use of existing land use plans for resource management decisionmaking until new plans under the proposed rulemakings are prepared.

Second, the initial regional leasing targets may be formulated on the basis of the analysis contained in the final environment statement on the Federal coal management program. If adopted, the proposed Subpart 3420 would provide that the regional leasing target provisions of §§ 3420.3 through 3420.3-4 would not be used in activity planning until after the Department of Energy issues the national coal production goals that are essential to activating the procedures for setting regional leasing targets and such procedures have been fully followed.

The formal State and Federal agency consultation provisions in section 3420.5 have been retained, even though another surface management agency will have indicated the acceptability of leasing in its land use planning process for the potential tract, and even though the States will have been involved in the process through the deliberations of the regional teams.

The provisions of §§ 3420.6 through 3420.6-3 are new since surface owner consent to lease has been required only since the enactment of the Surface Mining Control and Reclamation Act on August 3, 1977. The proposed rulemaking has been changed from the example rulemaking in order to incorporate the Under Secretary's expression of preference in an issue option memorandum of February 27, 1979, for the policy option of not scheduling for sale any tract on which written consent or evidence of such consent is not yet on record with the Bureau of Land Management. At the same time, § 3420.2-3(d)(2) has been added to allow the land use planner to consider changes in surface ownership or in the attitudes of qualified surface owners toward leasing.

Approximately 50 percent of the comments received on the example rulemaking were directed at the sections in Subpart 3420. Those comments ran from recommendations of support for actions taken in the example rulemaking to recommended changes to a large portion of the sections in Subpart 3420. Each of the comments was given careful consideration during the reexamination of the sections contained in Subpart 3420 and, where possible, were incorporated in the almost total rewrite and more orderly arrangement of Subpart 3420. The public is asked to review the new provisions of Subpart 3420 and to comment on the subpart.

Much of Subpart 3422 is derived from §§ 3525.2(e) and 3525.8 of existing regulations. The example rulemaking contained supplemental provisions dealing with the notice of sale and the bid evaluation after the sale. The example rulemaking also contained a listing of the information currently required by the Antitrust Division of the Department of Justice for its statutory review of lease issuance and readjustment. This listing had been used on the basis of an informal agreement with the Department of Justice. The Department of Justice has informally advised the Department of the Interior that it will change its reporting requirements. When the Department of the Interior receives any new or modified requirements, they will be substituted in § 3422.3-4.

The proposed rulemaking (§ 3422.1-1) changes the chronology of the sale process to provide that the public's views on fair market value and maximum economic recovery will be solicited as economic evaluation of the scheduled tracts begins, as well as after the Geological Survey makes its recommendation on these determinations to the Bureau of Land Management.

Three comments were received on the sections under Subpart 3422. Two comments questioned the bonus bid system with one comment focussing on the minimum bonus of $25 contained in § 3422.1-2. The comment pointed out that a bonus of $25 was not normally considered high, but in those cases where a 12½ percent royalty is mandated and where the Department, for the purposes of conservation, wishes to encourage maximum recovery of marginal value coal during ongoing mining, it might be too high. Even though this section has not been changed in the proposed rulemaking, a task force is currently considering the bonus bid and the establishment of a minimum bonus for future policy.

One comment received on § 3422.4 suggested that the section be altered to provide that the collection of receipts be accelerated to a maximum level so that cash management practices are observed. The section has not been changed to incorporate the comments offered. However, every effort will be made by the Bureau of Land Management to see that cash management practices are maximized.

Subpart 3425 contains the emergency leasing procedures. The Department of the Interior has had "short-term" or emergency leasing criteria ever since the imposition of the leasing "moratorium", with the first short-term standards in February 1973. The existing regulations contain a short-term need exception (43 CFR 3525.1(b)(2)) but do not specify criteria. Presently, the Department is conducting short-term lease sales at a rate of approximately two a month under criteria set forth in the modified court order in *NRDC* v. *Hughes*. The example rulemaking specified the conditions under which the Department would sell a lease outside of the normal competitive leasing process. The proposed rulemaking carries forward the example rulemaking criteria (which are similar to those in the modified court order in *NRDC* v. *Hughes*) with these following changes. (1) The proposed rulemaking sets a limitation on the number of years of reserves that can be leased to an existing operation. This is designed to avoid compromising the competitive leasing under the coal management program by meeting leasing targets only through issuance of leased to existing operators. The limit is designed so that future needs of the same existing operation should be able to be met through future cycles of the general competitive leasing process. (2) The proposed rulemaking establishes a "hardship" category much like the listed lease applications in the *NRDC* v. *Hughes* order, that will allow leasing that would lead to the opening of a new mine or expansion of an existing mine, with safeguards for the integrity of the general competitive leasing process. The Department recognized that there are urgent needs for Federal coal in cases where an existing operation is not about to shut down, as well as where one is about to close.

Apart from preference right leases, emergency leases are the only leases that will be issued in response to applications. The Department solicits com-

ments on these emergency leasing criteria to assist in the determination of whether legitimate needs for Federal coal may go unanswered under these criteria, or conversely, whether these criteria threaten the integrity of the general competitive leasing process.

The one comment received on Subpart 3425 of the example rulemaking was concerned that the "short-term", limited reserve, piecemeal leasing concept provided for in the example rulemaking would produce extremely small reserve blocks and thus create unnecessary difficulties for underground mines. The subpart has been rewritten and is new in its concept. The comment was given full consideration during the rewrite.

Subpart 3427 implements section 714 of the Surface Mining Control and Reclamation Act, and sets out when and how the Department of the Interior will determine whether split estate lands are acceptable for further consideration for leasing, are acceptable for tract ranking, but not scheduling, or are acceptable for lease sale. The provisions of Subpart 3427 were new in the example rulemaking and are carried forward to the proposed rulemaking with these changes: (1) The rulemaking now provides for a qualified surface owner to submit a "refusal to consent" that will result in the Department dropping coal underlying the covered surface from consideration for leasing for surface mining in activity planning whenever it is filed; and (2) the rulemaking deletes the exception formerly in § 3427.2 that allowed the Department to offer a tract for sale in certain circumstances even though written consent had not yet been given by the qualified surface owner. These changes are derived from the Under Secretary's expressions of preference for policy options in an issue option memorandum dated February 27, 1979.

With respect to the first of these issues, the rulemaking now proposes in § 3427.4 that a refusal of consent may be filed with the Bureau of Land Management at any time during activity planning and that the tract involved will be promptly eliminated from further activity planning for the life of the land use plan. In the February 27, 1979, memorandum, a second issue option was put forward to permit a qualified surface owner to disclose during the surface owner consultation screening process in land use planning that the owner has the firm intent not to provide consent to mine by other than underground methods during the life of the plan. Upon such a disclosure, that surface owner's land would be identified in the land use plan as land unsuitable for coal development by other than underground mining methods. The Under Secretary chose to defer a decision on this issue option, but to include it in the proposed rulemaking with a specific request for public comment. The Department solicits comments particularly on this firm intent disclosure procedure but also more generally on the procedures and policies set forth in this rulemaking for both surface owner consultation and surface owner consent acquisition.

In the preferred alternative that this proposed rulemaking implements, the Secretary chose to allow consents to be acquired only by private parties, not by the Bureau of Land Management. The Department also solicits comments on whether the Bureau of Land Management should negotiate consents from those qualified surface owners who seek to consent under any specific terms and have the coal deposits underlying their surface considered for leasing, but who do not wish to negotiate the terms of consent with any specific company.

Six comments were received on Subpart 3427. These comments were directed at the example rulemaking which has been substantially rewritten in the proposed rulemaking. A couple of the comments suggested that the proposed rulemaking should contain provisions that would automatically exclude lands from leasing when consent to lease has not been obtained from the surface owner. This suggestion was not adopted. The proposed rulemaking goes even further and now provides for refusals of consent on lands. A refusal to consent eliminates the lands from all consideration in the leasing process during the life of a land use plan. The proposed rulemaking has dropped the provision of the example rulemaking that allowed a State Director of the Bureau of Land Management to publish a notice of lease sale for split-estate land where the surface is owned by a qualified surface owner and conduct that sale even though no consent has been provided by the owner. This change was suggested in three comments received on the example rulemaking.

Subpart 3430 reflects wording found in Subpart 3521 of existing regulations, especially the procedures and standards for filing and adjudicating preference right lease applications that were issued prior to May 7, 1976 (41 FR 18843). The existing regulations were carried forward into the example rulemaking with only two signifcant changes: (1) specific provisions on the relationship of lease right adjudication and possible exchanges were added; and (2) a land use plan must be completed on the lands in the lease application. This will assure the application of the unsuitability criteria to preference right lease applications in manner consistent with land use planning on other lands. This latter requirement for land-use planning was an element in prior practice, but it was not made explicit in the prior regulations.

The example rulemaking provisions are carried into the proposed rulemaking with the addition of a provision (§ 3420.2-1(d)) incorporating the requirements that a complete application include a certified abstract of title for the purpose of determining whether the lands were "unclaimed and undeveloped" at the time a prospecting permit was issued prior to its amendment in 1976. This is necessary for consistency with the provisions of section 2(b) of the Mineral Leasing Act. See Solicitor's Opinion M-36893, 84 I.D. 442 (1977).

The Department of the Interior solicits comments from industry and the public on whether preference right lease application reserve data should be maintained as confidential after lease issuance, since: (a) The reserve calculations are essential to determining commercial quantities, a process that will include public participation in land use planning and the environmental assesssment processes under the National Environmental Policy Act of 1969; (b) the lease reserves must be calculated for the purpose of establishing the lessee's diligence requirements under the existing diligence regulations; and (c) Congress has provided that reserve data or exploration licenses be made public upon lease issuance.

Section 3430.2-2 of the example rulemaking was amended by the deletion of subsections (a) and (c). The time provided for filing an initial showing in response to the May 1976 regulations has passed, and any supplemental information showing how the applicant will comply with the reclamation requirments of the Office of Surface Mining Reclamation and Enforcement regulations can be submitted with the final showing, if necessary. The same is true of the abstracts of title needed to show that the permit lands were "unclaimed or undeveloped"—all abstracts are already filed except for those of applicants to whom specific extensions of time were granted. The extension periods with respect to the initial showing thus did not need to be carried forward from the existing regulations in Subpart 3521.

A total of ten comments were received on the various sections of subpart 3430 of the example rulemaking. All of the comments were considered during the decision process that led to the rewrite of the subpart in the proposed rulemaking. Some of the suggestions made in the comments were adopted as part of the rewrite. A number of the comments which were

not adopted were directed at what was claimed to be a change in the rights granted by a prospecting permit and the requirements that had to be met. The proposed rulemaking and its requirements relating to preference right lease applications is consistent with the various Acts of the Congress on the subject. A review of the Mineral Leasing Act of 1920 showed that it was the intent of Congress that the commercial quantities test applicable to preference right lease applications incorporate the standards of the prudent man test applicable under the Mining Law of 1872. It was found that, in the past, prospecting permits were issued too readily, resulting in vast areas being leased under preference right lease applications, but little or no mining being done. The proposed rulemaking is designed to create a coal management program that will cause diligent development of mining on leased lands.

Subpart 3431, which provides for the sale of coal to be taken in the exercise of a right-of-way granted across, through or under Federal lands, was now in the example rulemaking because the authority to dispose of coal in such a manner was not part of the law until enacted in October 1978. The provisions have not been significantly changed for their inclusion in the proposed rulemaking. No comments were received on this subpart of the example rulemaking.

The Department of the Interior solicts comments from those persons whose plans for the development of other Federal or non-Federal coal have been previously frustrated by the absence of this authority on whether the provisions of the proposed rulemaking will successfully implement the new authority.

The coal lease modification provisions of subpart 3432 were taken from existing regulations (43 CFR 3524.2-1) and expanded in drafting the example rulemaking to reflect the amendments in the Act of October 30, 1978 (Pub. L. 95-554) to the authority to make modification less burdensome on existing lessees.

A modified lease under the new authority is not subject to the increased minimum royalty and the new diligence requirements mandated by the Federal Coal Leasing Amendments Act. The example rulemaking also spelled out more precisely when noncompetitive "leasing by modification" could occur and when a tract would only be leased under the provisions of Part 3420.

The modification sections were moved from the part of the example rulemaking covering "management of existing leases" to the part of the proposed rulemaking covering "noncompetitive leasing" to reflect their function and potential significance as a system for leasing small tracts of Federal coal. No comments were received on these provisions of the example rulemaking.

The provisions of Subpart 3435 carry forward the existing regulations issued in December 1977 for the exchange of lease interests as they relate to the relinquishment of coal leases of preference right lease applications in an exchange. Comparable non-coal mineral lease exchange regulations will remain in the group 3500 regulations when they are rewritten. The proposed rulemaking is not significantly different from the example rulemaking. The proposed rulemaking thus carries forward the requirement that a preference right lease applicant must demonstrate the discovery of commercial quantities of coal on the applied for lands before an exchange involving those lands can be consummated (43 CFR 3425.2(a)). The proposed rulemaking carries forward the policy enunciated by the Department of the Interior in hearings on S. 3189, the generic coal leasing exchange authority legislation, in the 95th Congress that the Department would not seek authority to consummate an exchange in any case where the constraints of the Surface Mining Control and Reclamation Act could lawfully be applied to prevent environmentally unsatisfactory mining from occurring.

The proposed rulemaking was changed in one important respect from the example rulemaking in order to conform to the intent of Congress in the exchange of mineral leases and coal lands. Coal lease exchanges in alluvial valley floors, fee land exchanges in alluvial valley floors, and the special lease exchanges authorized by the Act of October 30, 1978 (Pub. L. 95-554), all are required to be equal value exchanges. Subpart 3435 in the example rulemaking, however, consistent with the provisions of the December 1977 regulations, from which it was derived, only required that the value of the exchange tracts be "comparable". Section 3435.3-3 of the proposed rulemaking requires that equal values be exchanged in any action under the subpart.

Comments were received from two different sources on this subpart of the example rulemaking. One of the comments raised a number of questions about the exchange procedure as it was presented in the example rulemaking and an effort was made in the rewrite of the subpart for the proposed rulemaking to address each of those questions. The other comment was directed at what perceived as unnecessary burdens placed on a lessee that is party to an exchange. These points were considered in the rewrite but little or no change was made in the proposed regulations.

Subpart 3436 of the proposed rulemaking implements the alluvial valley floor lease exchange authority contained in the Surface Mining Control and Reclamation Act. This provision appeared for the first time in the example rulemaking. The subpart incorporates the principles and procedures outline in Subpart 3435 of the proposed rulemaking to the extent applicable. No significant changes were made between the language of the example rulemaking and that of the proposed rulemaking.

One comment was received on this subpart of the example rulemaking. The comment raised a number of concerns about the procedures that will be followed in making exchanges under the provisions of the subpart. Detailed procedures will be developed when the manual sections for the subpart are prepared following the issuance of final rulemaking on a coal management program. All of the concerns are in areas that will be closely examined in developing the program procedures.

Subpart 3437, which is designed to implement partially the alluvial valley floor land exchange authority (private lands for Federal lands, with no lease interest involved) contained in the Surface Mining Control and Reclamation Act, was new language in the example rulemaking. The example rulemaking only made cross-reference to Group 2200 of existing regulations in Title 43, those that would be used to implement section 206, the general exchange authority of the Federal Land Policy and Management Act. The proposed rulemaking establishes criteria under which the Department of the Interior will determine which exchanges of potential alluvial valley floor private fee for federal fee the Department will, as an initial matter, consider consummating under the authority of section 206. These criteria are felt to be necessary since alluvial valley floor exchanges are by law to be carried out under section 206 of the Federal Land Policy and Management Act. Section 206 has no inherent limitations on when the Secretary may exchange lands in alluvial valley floors or elsewhere except for the requirements that the exchange be in the public interest, be for lands of equal value (with some cash equalization authorized), and be for lands in the same State. The same party that commented on Subpart 3436 commented on this subpart and again raised questions about the procedure to be followed in carrying out the subpart. As stated above, the procedure will be worked out in the Bureau of Land Management manual sections after the issuance of a final rulemaking.

Subpart 3440, which governs licenses to mine coal granted to persons or municipalities who supply coal only for domestic use, is derived from existing regulations (43 CFR Part 3530). The language of the example rulemaking has not been significantly changed in the proposed rulemaking. The Department of the Interior solicits comments about whether this little-used authority remains worthwhile and useful, or whether it is no longer relevant to the economic and environmental protection considerations controlling coal mining today. No comments were received on this subpart of the example rulemaking.

Subpart 3450 provides the language that will govern readjustment of the terms and conditions of Federal coal leases. Over half of the existing Federal coal leases will be subject to adjustment by 1986, and this is the time when the economic and other terms of each lease can be changed.

The example rulemaking expanded on the provisions of § 3522.2-1(b) of existing regulations, the existing readjustment provisions, to express more precisely both the procedures and the substance of lease readjustment, including consultation with the Attorney General with respect to the antitrust impacts of lease continuation under the proposed readjustment terms. The proposed rulemaking does not differ significantly from the example rulemaking.

Two comments were received on this subpart of the example rulemaking. One comment stated that the subpart provisions had the effect of changing agreed-on lease terms and impacted existing property rights and should be changed. The agreed-on terms of each lease provide for such readjustments, and Congress has required that each lease contain such a term. The second comment felt that a time limitation should be imposed on lease readjustments. This comment was partially adopted in changes to the proposed rulemaking by section 3451 which provides that, for leases which become subject to readjustment after 1980, the Bureau of Land Management's failure to notify the lessee that readjustment will occur will signify a waiver of the Bureau's right to readjust.

Subpart 3452 governs how Federal coal leases are closed out, whether at the initiative of the lessee or the United States. The language of the proposed rulemaking is carried forward from Subpart 3523 of the existing regulations without significant change. No comments were received on this portion of the example rulemaking.

Subpart 3452 is derived from the coal-related provisions of the existing regulations in Subpart 3506, "Assignments or Transfers and Subleases." The example rulemaking made no substantive changes in the language of the existing regulations. The proposed rulemaking, however, did make changes: (1) Revising the use of the word "transfers" to embrace all changes in ownership interests in Federal leases, whether designated assignments, subleases or whatever by the parties, thus simplifying the provisions; and (2) setting out clearly in checklist form the requirements for approval and causes for disapproval of any transfer of an interest in a Federal lease.

The Department of the Interior is presently examining its authority to condition approval of transfers of interests in coal leases on the submission of or agreement to specific development plans by the transferee, or to changes in the diligence provisions of the lease designed to assure that lease transfers are not serving solely speculative ends. If greater authority than that which is currently exercised exists, the Department will consider adding to this proposed rulemaking provisions relating to conditioning approval of transfers on specific development plans, much as the suspension of oil and gas leases are being conditioned under current Departmental policy. No public comments were received on this subpart of the example rulemaking.

Subpart 3461 of the proposed rulemaking sets out the content and procedures for the elements of the Federal lands review the Congress directed the Secretary to conduct in section 522(b) of the Surface Mining Control and Reclamation Act, and which the Bureau of Land Management, either by itself or through cooperative agreement with other surface management agencies, has been entrusted to carry out. As the Surface Mining Control and Reclamation Act was passed after the last regulatory revisions of the coal program, these provisions were developed for the example rulemaking. Several important changes have been made from the example regulations in the language of the proposed rulemaking.

First, the unsuitability criteria have been structured more precisely to spell out the exemptions to each criterion. Second, the provisions governing the application of the criteria to operations on existing leases (43 CFR 3461.1-2) have been expanded and clarified.

Most important, the proposed rulemaking clarifies the division of responsibility for the administration of the Surface Mining Control and Reclamation Act within the Department of the Interior by clearly distinguishing between the unsuitability assessments carried out by the Bureau of Land Management through its land use planning process and unsuitability designations carried out by the Office of Surface Mining Reclamation and Enforcement in response to petitions to formally designate (or to terminate designation of) Federal lands as unsuitable for all or certain types of surface coal mining operations (43 CFR 3461.1-3 and 3461-4). After making its assessment as part of the lands review, the Bureau of Land Management might: (a) Condition any leasing to require that operations be conducted in a manner consistent with the land use plan; (b) withdraw the Federal lands assessed as unsuitable; or (c) itself petition the Office of Surface Mining Reclamation and Enforcement to formally designate the lands as unsuitable.

The proposed rulemaking does not change the Department of the Interior's intention to make unsuitability assessments in the land use planning process (43 CFR 3420.2), a screening provision to be applied in determining what Federal lands are acceptable for further consideration for leasing.

An individual offered comments on this subpart of the example rulemaking during one of the field hearings. The comments were directed at what was perceived as a lack of guidance to Bureau of Land Management managers in preparing land use plans. This instruction will be provided by the proposed Group 1600 rulemaking that is now under review and by other policy guidance, rather than in this rulemaking. The same individual also raised questions about the designation of areas of critical environmental concern. These designations will be handled under guidelines now under development in the Bureau of Land Management and not in this rulemaking.

Six written comments were received on this subpart of the example rulemaking. One comment stated that industry nominations should be called for immediately after an area is determined unsuitable for mining. This suggestion was not adopted because industry is expected to participate fully in the land use planning process at each stage when an opportunity for public participation is provided. A second comment wanted a clarification of the exemption from unsuitablility criteria for lands on which surface mining operations were being conducted on August 3, 1977, or where substantial financial and legal commitments to the operations had been made prior to January 4, 1977. The exemption is required under section 522(a)(6) of the Surface Mining Control and Reclamation Act and is adequately covered in the proposed rulemaking. In addition, the definition section of the rulemaking defines "substantial financial or legal commit-

ment". Another comment raised questions about the applicability of the unsuitability criteria to existing leases. The critieria will be applied to existing leases during the land use planning process or when the mining plan is submitted, whichever comes first. The provisions of the Surface Mining Control and Reclamation Act authorize the application of the unsuitability criteria to existing leases.

One comment wanted Indian tribes to be included in the unsuitability criteria application process. The unsuitability criteria are applicable to Federal lands, which specifically excludes Indian lands. Indian tribes can submit their views on the application of unsuitability criteria to the Federal lands during the land use planning process. One comment raised two points, first, that the placing of the unsuitability criteria in the regulations rather than in manual sections or policy guidance documents might deny flexibility needed in certain cases, and second, that there seems to be little purpose to including lands determined to be unsuitable for mining within applications for exploration licenses. No changes have been adopted in response to the issues raised by this comment because, first, the criteria have been determined to be needed part of the rulemaking, and second, exploration could be useful for determining underground mining data. The final comment received indicated that the procedures for documenting exceptions in the example rulemaking do not appear to mesh with the Bureau of Land Management's present efforts to field test and incorporate the proposed unsuitability criteria into the land use planning system. The steps outlined in the FEDERAL REGISTER notice mentioned in the comment are only interim guidance for approved, ongoing land use plans. Future land use plans will be covered by later guidance in separate instructions.

The only changes to the wording of the specific criteria in this proposed rulemaking over the wording of those published in the example rulemaking were made to correct the criteria for conflicts with existing statutes and to improve their clarity. As noted above, the criteria as they appeared in the draft programmatic environmental statement are now being field tested. Changes suggested in comments received on the draft environmental statement and the example rulemaking will not be considered until results of the field testing have been assessed. This is expected to occur sometime during April, 1979. All comments will be considered prior to the issuance of the final rulemaking. If a proposed program is adopted and leasing resumes, the land use plans in the field test areas will be conformed to all revised criteria before leasing begins.

The provisions of Subpart 3465 of the proposed rulemaking generally govern environmental protection during operations on leases and licenses to mine. The example rulemaking was derived from Subpart 3041 of existing regulations, but was substantially reduced by the transfer of many of the surface management functions to the Office of Surface Mining Reclamation and Enforcement as a result of the passage of the Surface Mining Control and Reclamation Act. The example and proposed rulemaking reflect that transfer of functions.

Five comments were received from the public on this subpart of the example rulemaking. The first comment wanted to include language that would require compliance with the regulations of another Federal agency. This recommendation was incorporated in the proposed rulemaking. The other comments were aimed at changes that would bring the rulemaking more under the control of the environmental assessment process. The proposed rulemaking complies with the requirements of the National Environmental Policy Act and the environmental requirements of the Surface Mining Control and Reclamation act. No changes were adopted as a result of the review of these four comments.

Part 3470 contains the technical requirements of the coal management program, with Subpart 3471 setting out the requirements for land description in leases, what happens if the surface of the leased land is conveyed by the United States while the coal is under lease, and what protection is afforded bona fide purchasers of leases that are subject to cancellation or forfeiture. The language of this subpart is derived from §§ 3501.1-2, 3501.1-3, 3501.2-4, 3501.3-2(b)(2), 3501.3-3 and 3502.1-2 of existing regulations of title 43. Several insignificant changes in the language of the existing regulations were made in the proposed rulemaking. No comments were received on this subpart of the example rulemaking.

Subpart 3472 governs the qualifications to take or hold a coal lease. The language of the subpart is derived directly from Subpart 3502 of existing regulations with only slight modification. Two comments were received on this example subpart. One comment suggested that the acreage limitations imposed in the rulemaking were not needed. The limitations are established by the provisions of the Federal Coal Leasing Amendments Act of 1976 and have been retained in the proposed rulemaking. The other comment wanted to know if the restriction in the subpart pertaining to railroad holding companies holding leases applied to subsidiaries of a railroad. The limitation does not apply to a subsidiary of a railroad that is a legitimate mining company; such a company is authorized to hold a lease under the provisions of the Mineral Leasing Act.

The provisions of Subpart 3473 contain the financial terms of leases and the methods for getting them waived or reduced. The rulemaking language has been taken from Subpart 3503 of existing regulations. In the example rulemaking, the Department of the Interior raised the annual per acre lease rental. That increase, $3 per acre per year, has been carried forward to the proposed rulemaking. The proposed rulemaking also prohibits the reduction of the production royalty on surface-mined coal below 12½ percent and on underground-mined coal below 5 percent. The example rulemaking restated the Secretary of the Interior's authority without limiting the scope of the Secretary's discretion to reduce royalties. These reduction limitations are not required by law; they are proposed as an exercise of discretion.

Subpart 3474 contains the bonding requirements for Federal leases and was derived from Subpart 3504 of existing regulations. The example rulemaking contained several notable changes from the existing provisions. The bond required by the Bureau of Land Management no longer covers reclamation; the Office of Surface Mining Reclamation and Enforcement has assumed that bonding function in connection with the issuance and supervision of permits to mine. In addition, there is no longer any authorization for a nationwide or statewide bond; each lease of a Federal portion of a logical mining unit must be separately bonded. Upon issuance of this rulemaking in final form, each lessee holding such a blanket coverage bond would be notified of this requirement.

The proposed rulemaking changes the example rulemaking to standardize the terms used with respect to bonding. The term "performance bond" been limited to reclamation obligations. The term "lease bond", which has had many different uses, has been dropped, and the Department uses the term "compliance bond" in the proposed rulemaking to mean the bond covering compliance with the financial and other non-reclamation lease obligations of the lessee. The Department solicits comments on difficulties, if any, that Federal lessees have had or may have in securing adequate bonds for these purposes.

Subpart 3475 contains the general lease term provisions on diligent development and continued operation obligations (diligence requirement) issued by the Department of the Interior in May 1976 to cover the existing leases, and those issued in December 1976 to

cover leases issued after the passage of the Federal Coal Leasing Amendments Acts of 1976. The rulemaking is carried forward from §§ 3500.0-5 and 3520.2-5 of existing regulations without substantive change, since the authority to promulgate regulations respecting diligence on Federal coal leases was transferred to the Department of Energy by the Act creating that Department. If and when the Department of Energy promulgates new or additional diligence requirements for Federal coal leases, these provisions will be amended to state or simply cross-reference the Department of Energy regulations. Provisions dealing with the administration of the diligence requirements, such as in § 3452.3-2(b) of existing regulations, will remain.

The only comment received on the provisions of Part 3470 was one questioning the diligence requirements of Subpart 3475. The comment was considered and not adopted.

The principal authors of this proposed rulemaking are Steven Quarles and Charles Rech of the Office of Coal Leasing, Planning and Coordination; Lawrence McBride, Office of the Solicitor; and Don Mitchell, Office of Coal Management, Bureau of Land Management, assisted by the staff of the Division of Legislation and Regulatory Management of the Bureau of Land Management.

It has been determined that the publication of this document is a major Federal action significantly affecting the quality of the human environment. A draft environmental statement was published on December 15, 1978, and a final environmental statement is now being prepared pursuant to section 102(2)(C) of the National Environmental Policy act of 1969 (42 U.S.C 4332(2)(C)).

NOTE.—The Department of the Interior has determined that this document is not a significant regulatory action requiring the preparation of a regulatory analysis under Executive Order 12044 and 43 CFR Part 14.

Under the authority of the Mineral Leasing Act, the Mineral Leasing act for Acquired Lands, the Federal Land Policy and Management Act of 1976, the Surface Mining Control and Reclamation Act and the Multiple Mineral Development Act, it is proposed to amend Subchapter C, Chapter II, Title 43 of the Code of Federal Regulations by adding a new Group 3400 as set forth below:

GROUP 3400—COAL MANAGEMENT

PART 3400—COAL MANAGEMENT—GENERAL

Subpart 3400—Introduction—General

PART 3410—EXPLORATION LICENSES

Subpart 3410—Exporation Licenses

PART 3420—COMPETITIVE LEASING

Subpart 3420—Competitive Leasing
Subpart 3422—Lease Sales
Subpart 3425—Emergency Leasing
Subpart 3427—Split Estate Leasing

PART 3430—NONCOMPETITIVE LEASING

Subpart 3430—Preference Right Leases
Subpart 3431—Negotiated Sales—Rights-of-Way
Subpart 3432—Lease Modifications
Subpart 3435—Lease Exchange
Subpart 3436—Lease Exchange—Alluvial Valley Floors
Subpart 3437—Coal Exchange—Alluvial Valley Floors

PART 3440—LICENSES TO MINE

Subpart 3440—Licenses to Mine

PART 3450—MANAGEMENT OF EXISTING LEASES

Subpart 3451—Continuation of Leases—Readjustment of Lease Terms
Subpart 3452—Relinquishments, Cancellations, and Terminations
Subpart 3453—Transfers by Assignment, Sublease or Otherwise

PART 3460—ENVIRONMENT

Subpart 3461—Federal Lands Review—Unsuitability for Mining
Subpart 3465—Surface Management and Protection

PART 3470—COAL MANAGEMENT PROVISIONS AND LIMITATIONS

Subpart 3471—Coal Management Provisions and Limitations
Subpart 3472—Qualification Requirements
Subpart 3473—Fees, Rentals and Royalties
Subpart 3474—Bonds
Subpart 3475—Lease Terms

Group 3400—Coal Management

PART 3400—COAL MANAGEMENT—GENERAL

Subpart 3400—Introduction—General

Sec.
3400.0-3 Authority.
3400.0-4 Responsibilities.
3400.0-5 Definitions.
3400.1 Multiple development.
3400.2 Lands subject to leasing.
3400.3 Limited authority to lease.
3400.3-1 Consent or conditions of administering agency.
3400.3-2 Department of Defense lands.
3400.3-3 Department of Agriculture lands.
3400.3-4 Trust protection lands.
3400.4 Federal/State government cooperation.

AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C. 351-359; 30 U.S.C. 521-531; 30 U.S.C. 1201 et seq.; 42 U.S.C. 7101 et seq.; and 43 U.S.C. 1701 et seq.

Subpart 3400—Introduction—General

§ 3400.0-3 Authority.

(a) These regulations are issued under the authority of:

(1) The Mineral Leasing Act of February 25, 1920, as amended (30 U.S.C. 181 et seq.).

(2) The Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended (30 U.S.C. 351-359).

(3) The Federal Land Policy and Management Act of 1976, October 21, 1976 (43 U.S.C. 1701 et seq.).

(4) The Surface Mining Control and Reclamation Act of 1977, August 3, 1977 (30 U.S.C. 1201 et seq.).

(5) The Multiple Mineral Development Act of August 13, 1954 (30 U.S.C. 521-531).

(6) The Department of Energy Organization Act of August 4, 1977 (42 U.S.C. 7101 et seq.).

(7) The National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

(b) Specific citations of authority in subsequent subparts of this Group 3400 are to authorities from which the subpart is chiefly derived or which the subpart chiefly implements.

§ 3400.0-4 Responsibilities.

(a) The Bureau of Land Management has the responsibility on Federal lands to:

(1) Determine the acceptability of lands for leasing and development, except as provided in subsection (c)(7) of this section;

(2) Issue, modify and readjust leases and serve as the Office of Record for transfers, relinquishments and similar transactions on leases;

(3) Ensure that fair market value is received for rights to extract Federal coal before issuing a lease;

(4) Issue and administer all use authorizations for facilities related to coal development on BLM administered lands outside the area of mining operations;

(5) Determine, in consultation with the Office of Surface Mining Reclamation and Enforcement, the appropriate post-mining land use of BLM administered lands on which surface coal mining operations will be conducted;

(6) Include terms in each lease to protect nonmineral resources and to ensure reclamation of mined lands to the applicable standards;

(7) Recommend judicial action to cancel leases for noncompliance with lease terms;

(8) Consult with other surface management agencies and surface owners when they are involved in or affected by coal management actions that are the primary responsibility of the Bureau of Land Management; and

(9) Adjudicate applications for, issue, and administer exploration licenses.

(b) The Geological Survey has the responsibility on Federal lands to:

(1) Supervise production and resource recovery in the area of mining operations;

(2) Make geologic, engineering, coal resource economic value, and maximum economic recovery determinations for the Department's leasing program;

(3) Review and concur with mining and exploration plans and amendments to plans to establish production and resource recovery requirements;

(4) Approve exploration plans and supervise exploration under an exploration license, and on a lease outside a permit area; and

(5) Deal with operators on the matters listed in paragraphs (a)(1) through (4) of this section.

(c) The Office of Surface Mining Reclamation and Enforcement has the responsibility on Federal lands to:

(1) Approve mining and reclamation permit applications;

(2) Ensure that mining operations are consistent with environmental criteria and reclamation plans;

(3) Monitor reclamation operations for compliance with plans;

(4) Deal with operators during mining operations on the matters listed in paragraph (c)(1) through (3) of this section;

(5) Ensure that the rights of holders of noncoal Federal leases and permits are protected in the permit approval process;

(6) Negotiate, in consultation with the Bureau of Land Management and Geological Survey, and recommend for Secretarial approval, cooperative agreements with the states to establish the authority of state regulatory agencies over Federal operations on a lease; and

(7) Designate lands, in response to petitions, as unsuitable for all or certain kinds of surface mining operations, reject petitions, and terminate designations of lands.

(d) The Fish and Wildlife Service has the responsibility on Federal lands to:

(1) Protect and conserve endangered and threatened species, migratory birds, eagles, and other fish and wildlife;

(2) Recommend lands unsuitable for leasing due to fish, wildlife, and related ecological values;

(3) Recommend tract ranking factors and weights, for fish and wildlife;

(4) Recommend lease stipulations related to fish and wildlife values;

(5) Review and recommend post mining land uses of surface mined lands as they relate to the creation or maintenance of fish and wildlife values;

(6) Review exploration, mining, and reclamation plans to make recommendations about their potential impacts on fish and wildlife values; and

(7) Review water resource development projects and all other projects that will result in the impoundment, diversion or control of streams or other bodies of water, for the purposes of mitigating or avoiding adverse impacts on fish and wildlife values.

§ 3400.0-5 Definitions.

As used in this part:

(a) "Alluvial valley floor" means unconsolidated, stream-laid deposits holding streams where water availability is sufficient for subirrigation or flood irrigation agricultural activities. This definition does not encompass upland areas generally covered by a thin veneer of colluvial deposits composed chiefly of debris from sheet erosion; deposits laid down by unconcentrated runoff or slope wash, including talus; other mass movement accumulations; and windblown deposits.

(b) "Area of Mining Operation" means that area of non-Federal land and Federal land under lease or license to mine (within a logical mining unit) that (1) contains surface or underground excavations from which coal is extracted as part of a commercial venture, that is, one which has a historic production record or existing contractual production commitments or both; (2) contains support facilities that contribute directly to coal mining, preparation and handling; or (3) contains coal reserves intended for extraction in the course of the mining operation.

(c) "Authorized officer" means any employee of the Bureau of Land Management delegated the authority to perform the duty described in the section in which the term is used.

(d) "Bonus" means that the value in excess of the rentals and royalties that accrues to the United States because of coal resource ownership.

(e) "Bypass coal" means an isolated coal deposit that cannot, for the foreseeable future, be practically mined either separately as part of any logical mining unit other than that of the applicant for an emergency lease under the provisions of Subpart 3425 of this chapter.

(f) "Certificate of bidding rights" means a right granted by the Secretary to apply the fair market value of a relinquished coal or other mineral lease or right to a preference right lease as a credit against the bonus bid or bids on a competitive lease or leases acquired at a lease sale or sales.

(g) "Coal deposits" mean all Federally-owned coal deposits, except those held in trust for Indians.

(h) "Coal resource ecomomic value (CREV)" means the value of the coal resource in a lease in its best operational and market application.

(i) "Commercial quantities" as used in paragraph (n) mean:

(1) For any lease issued after August 4, 1976, an amount of production equal to one percent of the LMU reserves per year; or

(2) For any lease issued before August 4, 1976, an amount of production equal to one-fortieth of the LMU reserves per year.

(j) "Compliance bond" means the bond or equivalent security given the Department to assure payment of all obligations under a lease, exploration license, or license to mine, and to assure that all aspects of the mining operation other than reclamation operations on a lease are conducted in conformity with the approved mining or exploration plan. This is the same as the "lease bond" referred to in 30 CFR 742.11(a).

(k) "Continued operation" means the production of coal equal to one percent of the LMU reserves for each of the first two years following the achievement of diligent development, and an annual average amount of one percent of the LMU reserves thereafter. The average annual amount shall be computed on a three year basis, and the three-year period for which the average shall be computed shall consist of the year in question and the two preceding years.

(l) "Contiguous" means having at least one point in common, including cornering tracts.

(m) "Department" means the United States Department of the Interior.

(n) "Diligent development" means (1) for any lease issued after August 4, 1976, the timely preparation for and initiation of coal production from the LMU of which the lease is a part so that coal is actually produced in commercial quantities by the end of the tenth year from the effective date of the lease; or

(2) For any lease issued before August 4, 1976, the timely preparation for and initiation of coal production from the LMU so that coal is actually produced in commercial quantities before June 1, 1986, except that the period of time during which production of coal in commercial quantities must be achieved may be extended as provided in 43 CFR 3475.4.

(o) "Exploration" means drilling, excavating, and geological, geophysical or geochemical surveying operations designed to obtain detailed data on the physical and chemical characteristics of coal deposits and their environment including the strata above and below the deposits, the hydrologic conditions associated with the deposit, and any other information that may be used to prepare a coal resource evaluation of the land.

(p) "Exploration license" means a license issued by the authorized officer

to permit the licensee to explore for coal on Federal lands under terms and conditions that will protect the surface and subsurface resources and the environment, and provide for the reclamation of areas distrubed by such exploration.

(q) "Exploration plan" means a plan prepared in sufficient detail to show the location and type of exploration to be conducted, environmental protection procedures, present and proposed roads, and reclamation and abandonment procedures to be followed upon completion of operations under an exploration license.

(r) "Fair market value" means that amount in cash, or on terms reasonably equivalent to cash, for which in all probability the coal deposit would be sold or leased by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desires but is not obligated to buy or lease.

(s) "Federal lands" mean lands owned by the United States, without reference to how the lands were acquired or what Federal agency administers the lands, including mineral estates or coal estates underlying private surface, excluding lands held by the United States in trust for Indians, Aleuts or Eskimos.

(t) "Governmental entity" means a Federal or State agency or municipality or their subdivisions, including any corporation acting primarily as an agency or instrumentality of a State, which produces electrical energy for sale to the public.

(u) "Grant of modifications" means the Secretary's approval to expand an existing lease to include additional coal lands or deposits contiguous to the existing lease.

(v) "Interest" in a lease, application or bid means: any record title interest, overriding royalty interest, working interest, operating rights or option, or any agreement covering such an interest; any claim or any prospective or future claim to an advantage or benefit from a lease; and any participation or any defined or undefined share in any increments, issues, or profits that may be derived from or that may accrue in any manner from the lease based on or pursuant to any agreement or understanding existing when the application was filed or entered into while the lease application or bid is pending.

(w) "Intertract bidding competition" means a lease sale method where tracts containing more reserves in total than the Department intends to lease in that sale are offered for sale, and each bidder competes against other bidders on the same tract for which he bids and against bidders on the other tracts offered in the same sale.

(x) "Know Recoverable Coal Resource Area (KRCRA)" means an area determined by the Geological Survey, where data are believed to be sufficient to evaluate the extent, depth, quality, and potential for development of coal deposits that are technically recoverable based on past and current mining practices in the area. Boundaries for such as area show only the extent of recoverable coal deposits based on data available at the time of determination.

(y) "Lease" means a Federal lease, issued under the coal leasing provisions of the mineral leasing laws, which authorizes the exploration for and extraction of coal. In provisions of this Group that refer to Federal leases for minerals other than coal, the term "Federal coal lease" may be used.

(z) "Licensee" means the holder of an exploration license.

(aa) "License to mine" means a license issued under the provisions of Part 3440 of this Chapter to a municipality or charitable organization to mine coal for domestic use.

(bb) "Logical Mining Unit (LMU)" means an area of coal land that can be developed and mined in an efficient, economical, and orderly manner with due regard for the conservation of coal reserves and other resources. An LMU may consist of one or more leases and may include intervening or adjacent non-Federal lands, but all lands in an LMU must be contiguous, under the effective control of a single operator, and capable of being developed and operated as a unified operation with complete extraction of the LMU reserves within 40 years from the date of first approval of a mining plan for that LMU. No LMU approved after August 4, 1976, shall exceed 25,000 acres, including both Federal and non-Federal coal deposits.

(cc) "Logical Mining Unit reserves" mean the sum of (1) estimated recoverable reserves under Federal lease in the LMU, and (2) estimated non-Federal recoverable reserves in the LMU. The LMU reserves associated with a Federal lease are the LMU reserves estimated as of the effective date of the LMU, of which that lease is a part, except that the LMU reserves of this section may be adjusted by the Mining Supervisor whenever he approves a modification of the LMU boundaries or whenever significant new information becomes available concerning the amount of such reserves.

(dd) "Maximum economic recovery (MER)" means the amount of coal that can be recovered by prudent mining practices from all seams that are collectively profitable to be mined on any tract evaluated for a lease sale at the time of the MER determination. Social and environmental costs shall be considreed in determining profitability.

(ee) "Mining method evaluation" means a written comparison of mining method alternatives used to determine maximum economic recovery.

(ff) "Mineral leasing laws" mean the Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.), and the Mineral Leasing Act for Acquired lands of 1947, as amended (30 U.S.C. 351-359).

(gg) "Mining plan" means a mining and reclamation operations plan that fully complies with the requirements of the Mineral Leasing Act of 1920 as amended, the Suface Mining Control and Reclamation Act of 1977, and all other applicable laws.

(hh) "Mining Supervisor" means the Area Mining Supervisor, Conservation Division, U.S. Geological Survey, or the District Mining Supervisor or a subordinate acting under the Supervisor's direction.

(ii) "Mining unit" means an area containing technically recoverable coal that will feasible support a commerical mining operation. The coal may either be Federal coal or be both Federal and non-Federal coal.

(jj) "Operator" means a lessee, licensee or one conducting operations on a lease or exploration license under the authority of the lessee or licensee.

(kk) "Participate" means to have or take part or share with others in an exploration license.

(ll) "Permit" means the document issued, to authorized surface coal mining and reclamation operations on Federal lands either by the Director of the Office of Surface Mining Reclamation and Enforcement or, where a cooperative agreement pursuant to section 523 of the Suface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1273) has been executed by the state regulatory authority (30 CFR Part 741), after approval of a mining plan by the Assistant Secretary, Energy and Minerals.

(mm) "Permit area" means the area, including all natural and human resources, included within the boundaries specified in a permit, whether or not the areas will be affected by surface coal mining and reclamation operations, which is designated on the approved maps submitted by the applicant with this permit application and which is covered by the performance bond required Part by CFR Parts 800-808.

(nn) "Public bodies" means Federal and state agencies, municipalities, rural electric cooperatives and similar organizations, and nonprofit corporations controlled by any such entities.

(oo) "Qualified surface owner" means the natural person or persons (or corporation, the majority stock of

which is held by by a person or persons) who:

(1) Hold legal or equitable title to the land surface;

(2) Have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by suface mining operations; or receive directly a significant portion of their income, if any, from such farming and ranching operations; and

(3) Have met the conditions of (paragraphs (00) (1) and (2) of this section for a period at least 3 years prior to the granting of any consent to mining of their lands. In computing the three year period the authorized officer may include periods during which title was owned by a relative of such person by blood or marriage if, during such periods, the relative would have met the requirements of this subsection.

(pp) "Reserves" means coal deposits which are economically feasible to extract.

(qq) "Secretary" means the Secretary of the Interior or his authorized representative.

(rr) "Sole party in interest" means a party who is and will be vested with all legal and equitable rights under a lease, bid, or an application for a lease. No one is, or shall be considered, a sole party in interest with respect to a lease or bid in which any other party has any interest.

(ss) "Split estate" means land in which the ownership of the surface is held by persons including governmental bodies, other than the Federal government and the ownership of underlying coal is, in whole or in part, reserve to the Federal government.

(tt) "Substantial legal and financial commitments" mean major investments of money in power plants, railroads, coal handling and storage facilities and other capital intensive improvements, and fixed equipment made on the basis of long-term, legally enforceable coal sales contracts. Investments are "major" if they are substantial in relationship to the aggregate capital expenditures which reasonable can be anticipated to be made for capital improvements and fixed equipment at the mine site up to and including completion of all reclamation operations. Costs of the acquisiton of the coal in place or of the right to mine it do not alone constitute "substantial legal an financial commitments".

(uu) "Surface management agency" means the Federal agency with jurisdiction over the surface of Federally owned lands containing coal deposits.

(vv) "Surface Mining Office" means the field representative authorized to act for Director of the Office of Surface Mining, Reclamation and Enforcement.

(ww) "Surface mining operation" means activities conducted on the surface of the lands in connection with a surface coal mine or surface operations and surface impacts incident to an underground mine, as defined in section 701(28) of the Surface Mining Reclamation and Environmental Act of 1977, 30 U.S.C. 1291(28).

(xx) "Written consent" means the document or documents that the surface owner has signed that: (1) Permit a coal operator to enter and commence surface mining of coal; (2) describe any financial considerations given or promised in return for the permission, including in-kind considerations; (3) described any considerations given in terms of type or method of operation or reclamation for the area; (4) contain any supplemental or related contracts between the surface owner and any other person party to the permission; and (5) contain a full and accurate description of the area covered by the permission.

§ 3400.1 Multiple Development.

The granting of the exploration license, a license to mine or a lease for the prospecting, development, or production of coal deposits will neither preclude the issuance of prospecting permits or mineral leases for prospecting, development or production of deposits of other minerals in the same land with suitable stipulations for simultaneous operation, nor will it preclude the allowance of applicable entries, locations, or selections of leased lands with a reservation of the mineral deposits to the United States.

§ 3400.2 Lands subject to leasing.

The Secretary may issue coal leases on all Federal lands except:

(a) Lands in:

(1) The National Park System;

(2) The Natonal Wildlife Refuge System;

(3) The National Wilderness Preservation System;

(4) The National System of Trails;

(5) The National Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic River Act;

(6) Incorporated cities, towns, and villages;

(7) The Naval Petroleum Reserves, the National Petroleum Reserve in Alaska, and oil shale reserves; and

(8) National Recreation Areas.

(b) Tide lands, submerged coastal lands within the Continental Shelf adjacent or littoral to any part of land within the jurisdiction of the United States;

(c) Land acquired by the United States for the development of mineral deposits, by foreclosure or otherwise for resale, or reported as surplus property pursuant to the provisions of the Surplus Property Act of 1944; and

(d) Lands acquired with money derived from the Land and Water Conservation Fund.

§ 3400.3 Limitations on authority to lease.

§ 3400.3-1 Consent or conditions of administering agency.

(a) Leases for land, the surface of which is under the jurisdiction of any Federal agency other than the Department of the Interior, may be issued only with the consent of the head or other appropriate official of the other agency having jurisdiction over the lands containing the coal deposits or holding a mortgage or deed of trust secured by such lands.

(b) Exploration licenses and licenses to mine for lands described in paragraph (a) of this section shall be subject to such conditions as that official may prescribe with respect to the use and protection of the nonmineral interests in the lands, but may be issued without the consent of that official.

§ 3400.3-2 Department of Defense lands.

The Secretary may issue leases with the consent of the Secretary of Defense on acquired lands set apart for military or naval purposes only if the leases are issued to a governmental entity which:

(a) Produces electrical energy for sale to the public;

(b) Is located in the state in which the leased lands are located; and

(c) Has production facilities in that state, and will use the coal produced from the lease within that state.

§ 3400.3-3 Department of Agriculture lands.

(a) Subject to the provisions of § 3400.3-1, the Secretary may issue leases that authorize surface coal mining operations on Federal lands within a National Forest or a National Grassland, where:

(1) There are no significant recreational, timber, economic or other values which may be incompatible with the surface mining operations; and

(2) Either (i) the surface mining operations are incident to an underground coal mine; or (ii) the Secretary of Agriculture determines (on lands west of the 100th Meridian that do not have significant forest cover) that surface mining complies with the Multiple-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1976, the National Forest Management Act of 1976, and the Surface Mining Control and Reclamation Act of 1977.

(b) The Secretary may not issue leases that would authorize surface mining operations on Federal lands

within the boundaries of the Custer National Forest. § 3400.3-4 Trust protection lands. The regulations in this group do not apply to the leasing and development of coal deposits held in trust by the United States for Indians. See 43 CFR 3500.0-5(s). Regulations governing those deposits are found in 25 CFR Chapter I.

§ 3400.4 Federal/State government cooperation.

(a) In order to implement the requirements of law for Federal-State cooperation in the management of Federal lands, a Department/State regional coal team shall be established for each coal region. The team shall consist of a Bureau of Land Management field representative for each State in the region, who will be the State Director, or, in his absence, his designated representative; the Governor of each State or, in his absence, his designated representative; and a representative appointed by and responsible to the Director of the Bureau of Land Management. The Director's representative shall be chairman of the team. If the region is a multi-State region under the jurisdiction of one Bureau of Land Management State Office, the State Director shall designate a second representative.

(b) Each regional coal team shall consider and suggest policy for regional target setting, tract delineation, and site specific analysis in the coal production region, guide and review tract ranking, and conduct the selection and sale scheduling process in order to suggest regional lease sale alternatives to be analyzed in the regional lease sale environmental statement and to be recommended to the Secretary. Each team member may submit a lease sale schedule alternative which shall be treated equally in the draft and final regional lease sale environmental statement.

(c) Upon completion of the final regional lease sale environmental statement, the chairman shall submit the recommendations of the regional coal team to the Director. Any disagreement as to the recommendations among the team shall be documented and submitted by the chairman along with the team recommendation. The Director shall submit the final regional environmental statement to the Secretary for his decision, together with the recommendations of the team and any recommendations the Director may wish to make after review of the final statement.

(d) The regional coal team shall also serve as the general Department/State forum for all other major Department coal management program decisions in the region, concerning preference right lease applications, public body and small business setaside leasing, emergency lease, exchanges, and readjustment of lease terms and exploration licenses.

(e) Participation in the proceedings of a regional coal team need not be limited to the designated representatives of the Bureau of Land Management State Directors or the Governors. Additional representatives of State and Federal agencies may participate directly in team meetings or indirectly in the preparation of material to assist the team at different points in the process at the request of the team chairman. At a minimum, participation shall be solicited from State and Federal agencies with special expertise in topics considered by the team or with direct responsibilities in areas potentially affected by coal management decisions. However, at every point in the deliberations the official team spokespersons for the Bureau of Land Management and for the Governors shall be those designated under paragraph (a) of this section.

PART 3410—EXPLORATION LICENSES

Subpart 3410—Exploration Licenses

Sec.

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AUTHORITY: 30 U.S.C. 181 et seq.

Subpart 3410—Exploration Licenses.

§ 3410.0-1 Purpose.

This subpart provides for the issuance of licenses to explore for coal deposits subject to disposal under Group 3400.

§ 3410.0-2 Objective.

The objective of this subpart is to allow private parties singularly or jointly to explore coal deposits to obtain geological, environmental, and other pertinent data concerning the coal deposits.

§ 3410.0-3 Authority.

(a) These regulations are issued under the authority of the statutes listed in § 3400.0-3 of this Group, principally section 30 of the Mineral Leasing Act of 1920 (30 U.S.C. 189).

(b) These regulations primarily implement section 2(b) of the Mineral Leasing Act of 1920, as amended by section 4 of the Federal Coal Leasing Amendments Act of 1976 (30 U.S.C. 201(b)).

§ 3410.0-4 Responsibilities.

(a) The Bureau of Land Management exercises the Secretary's discretionary authority to determine whether exploration licenses are to be issued. The Bureau is also responsible for issuing and cancelling exploration licenses and terminating the period of liability of the licensee under any bond he may have posted as a condition of license issuance. The regulations in this Subpart shall be administered by the Director of the Bureau of Land Management through the State Director and the authorized officer, subject to the supervisory authority of the Secretary. The Bureau of Land Management State Office having jurisdiction over the lands involved (43 CFR Subpart 1821) is also the Office of Record.

(b) The Geological Survey exercises the Secretary's authority regarding operations conducted within the area covered by the license, including responsibility for all geological, economic, and engineering determinations.

(c) The authorized officer, in consultation with the Geological Survey, and where appropriate, the surface management agency, the Fish and Wildlife Service, and the surface owner, if other than the United States, formulates the requirements to be incorporated in exploration licenses for the protection of the surface resources and for reclamation.

(d) The Geological Survey, after consultation with the authorized officer, and where appropriate, the surface management agency and the surfce owner, if other than the United States, shall provide technical review and approval of the exploration plan. The Geological Survey shall recommend bonding requirements to the Bureau of Land Management. Upon the completion of exploration operations, the Geological Survey shall recommend termination of the period of the licensee's liability under any bond posted.

§ 3410.1 Exploration licenses—Generally.

§ 3410.1-1 Lands subject to exploration licenses.

(a) Exploration licenses may be issued for:

(1) Lands administered by the Secretary that are subject to leasing, § 3400.2;

(2) Lands administered by the Secretary of Agriculture through the Forest Service or other agency that are subject to leasing, § 3400.2;

(3) Coal deposits in lands which have been conveyed by the United States subject to a reservation to the United States of the mineral or coal deposits, to the extent that those deposits are subject to leasing under § 3400.2; and

(4) Coal or lignite deposits in acquired lands set apart for military or naval purposes.

(b) No exploration license shall be issued for land on which a lease has already been issued.

§ 3410.1-2 When an exploration license is required.

(a) An exploration license shall not be required for "casual use" as defined in 30 CFR 211.10(a).

(b) No person may conduct exploration activities for commerical purposes on lands subject to this subpart without an exploration license.

(c) Exploration activities conducted without an exploration license in violation of paragraph (b) of this section shall constitute a trespass, and shall be subject to the provisions of 43 CFR 9239.5-3(f).

§ 3410.2 Prelicensing procedures.

§ 3410.2-1 Application for an exploration license.

(a) Exploration license applications shall be submitted at the Bureau of Land Management State Office having jurisdiction over the lands covered in the application (43 CFR Subpart 1821). The applications shall be subject to the following requirements:

(1) No specified form of application is required.

(2) The area to be explored shall be described by legal description or, if on unsurveyed lands, by metes and bounds.

(3) Each application shall contain three copies of an exploration plan which complies with the requirements of 30 CFR 211.10(a).

(4) Each application and its supporting documents shall be filed with a nonrefundable filing fee (43 CFR 3473.2).

(5) Coal exploration license applications shall normally cover no more than 25,000 acres in a reasonably compact area and entirely within one State. Applications for more than 25,000 acres must include a justification for an exception to the normal acreage limitation.

(b) Any person qualified to hold a lease under the provisions in Subpart 3472 of this chapter may apply for an exploration license.

(c) Nothing in this Subpart shall preclude the authorized officer from issuing a call for expressions of leasing interest in exploration licenses for a given area.

(d) Applicants for exploration licenses shall be required to provide an opportunity for other parties to participate in exploration under the license on a pro rata cost sharing basis.

(1) Immediately upon the filing of an application for an exploration license the applicant shall publish a "Notice of Invitation," approved by the authorized officer, once every week for four consecutive weeks in at least one newspaper of general circulation in the area where the lands covered by the license application are situated. This notice shall contain an invitation to the public to participate in the exploration under the license. Copies of the Notice of Invitation shall be filed with the authorized officer two weeks prior to publication by the applicant, for posting in the proper Bureau of Land Management Office and for Bureau of Land Management's publication of the Notice of Invitation in the FEDERAL REGISTER.

(2) Any person who elects to participate in the exploration program contained in the application shall notify the authorized officer and the applicant in writing within 30 days after the final publication. Any person who seeks to participate in the exploration program, but who wants the exploration program modified in any respect shall submit, with his notification to the authorized officer, three copies of an exploration plan that complies with the requirements of 30 CFR 211.10(a), showing the modifications that would be required in the exploration plan in which he seeks to participate. The authorized officer may require modification of the original exploration plan to accommodate the needs of additional participants.

(e) An application to conduct exploration which could have been conducted as a part of exploration under an existing or recent coal exploration license may be rejected.

§ 3410.2-2 Environmental review.

(a) Before an exploration license may be issued, the authorized officer, using the exploration plan submitted by the applicant, as approved by the Geological Survey, shall make an assessment of the potential effect of such exploration on the area and its environment. Aspects of the environment to be examined include surface water and groundwater; fish and other aquatic resources; wildlife habitats and populations; visual resources; recreational resources; cultural resources; and social factors in the affected area.

(b) If, before issuance of the license, the authorized officer determines that an environmental statement is required by Section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)), a statement shall be prepared.

§ 3410.2-3 Cultural resources.

If lands in or nominated for inclusion in the National Register of Historic Places contain cultural resources which might be affected by an action taken under an exploration license, no exploration license for such land shall be authorized until after compliance with section 106 of the Historic Preservation Act (16 U.S.C. 470f). Other cultural resource values shall also be protected pursuant to Section 105 of the Historic Preservation Act.

§ 3410.2-4 Threatened or endangered species.

If threatened or endangered species of fauna or flora or their critical habitat would be destroyed or adversely modified as a result of the issuance of an exploration license, no exploration license for such lands shall be authorized. In making this determination the authorized officer shall consult any other surface management agency, and if the presence of threatened or endangered species or their habitat is suspected or known, with the Fish and Wildlife Service in accordance with 50 CFR Part 402.

§ 3410.2-5 Surface management agency.

The authorized officer may issue an exploration license covering lands the surface of which is under the jurisdiction of any Federal agency other than the Bureau of Land Management only in accordance with those conditions prescribed by the surface management agency concerning the use and protection of the nonmineral interests in those lands.

§ 3410.2-6 Substantial disturbance to the natural land surface.

No exploration license shall be issued if exploration under it would result in substantial disturbance to the natural land surface. Substantial disturbance to the natural land surface means any disturbance other than that necessary to determine the nature of the overlying strata and the depth, thickness, shape, grade, quality and hydrologic conditions of the coal deposit, or which causes unnecessary and undue degradation of the lands.

§ 3410.3 Exploration licenses.

§ 3410.3-1 Issuance and termination of an exploration license.

(a) The authorized officer has the discretion of issuing an exploration licenses or rejecting the application therefor under this subpart.

(b) An exploration license shall become effective on the date specified by the authorized officer as the date when exploration activities may begin. An exploration license shall not be valid for more than two years from its effective date. Cleanup and reclamation must be completed during this period.

(c) An exploration plan approved by Geological Survey shall be attached and made a part of each exploration license issued.

(d) Subject to the continued obligation of the licensee and the surety company to comply with the terms and conditions and special stipulations of the exploration license, the exploration plan, and the regulations, a licensee may relinquish an exploration license for all or any portion of the lands in it. A relinquishment shall be filed in the Bureau of Land Management State Office in which the original application was filed. See 43 CFR Subpart 1821.

(e) An exploration license may be revoked by the authorized officer for noncompliance with its terms, the exploration plan, or the regulations, after the authorized officer has notified the licensee of the violation(s) in writing and the licensee has failed to correct the violation(s) within the period prescribed in the notice.

(f) Should a licensee request a modification to the exploration plan, the Mining Supervisor, with the concurrence of the authorized officer, and where appropriate the surface management agency, may approve the modification if geologic or other conditions warrant. If modification of the exploration plan could result in significant disturbance or damage, the authorized officer, after consultation with the Mining Supervisor, and where appropriate, the surface management agency, may adjust the terms and conditions of the license to mitigate such disturbance or damage. Unless the licensee concurs in the adjusted terms and conditions of the license, the modification of the exploration plan will not be approved.

(g) When unforeseen conditions that could result in significant disturbances or damage to the environment are encountered, or when geologic or other physical conditions warrant a modification in the approved exploration plan, (1) the authorized officer, after consultation with the Mining Supervisor, and where appropriate, the surface management agency, may adjust the terms and conditions of the exploration license, or (2) the Mining Supervisor, after consultation with the authorized officer and where appropriate, the surface management agency, may direct adjustment in the exploration plan. If the licensee does not concur in the adjustment of the terms of the exploration license and exploration plan, he may relinquish the exploration license.

(h) Exploration licenses shall not be extended. Exploration operations may not be conducted after the exploration license has expired. The licensee may apply for a new exploration license as described in § 3410.3-1. A new exploration license may be issued simultaneously with the termination of the existing exploration license.

§ 3410.3-2 Limitations on exploration licenses.

(a) The issuance of exploration licenses for an area shall not preclude the issuance of leases under applicable regulations for that area. If a lease is issued for lands included in an exploration license, the authorized officer shall cancel the exploration license on the effective date of the lease for those lands which are common to both.

§ 3410.3-3 Operating regulations.

The licensee shall comply with the provisions of the operating regulations of the Geological Survey (30 CFR Part 211). Copies of the operating regulations may be obtained from the Mining Supervisor. Authorized representatives of the Secretary and, where appropriate, any surface management agency shall be permitted to inspect the premises and operations. The licensee shall provide for the free ingress and egress of Government officers and other persons using the lands under authority of the United States.

§ 3410.3-4 Surface protection and reclamation.

(a) The authorized officer shall include in each exploration license requirements and stipulations to protect the environment and associated natural resources and to ensure reclamation of the land disturbed by exploration.

(b) The exploration plan shall be designed to prevent substantial disturbance of the natural land surface.

(c) The authorized officer may issue an exploration license for Federal lands underlying private surface. The establishment of the bond amount, when the exploration license will embrace such lands, shall reflect any agreement or lack of agreement between the license applicant and the surface owner with respect to consent to or compensation for operations on the surface of the lands in the exploration license.

§ 3410.3-5 Ground and surface water data.

The applicant may be required to collect and report ground and surface water data to the authorized officer.

§ 3410.3-6 Bonds.

(a) Bonding provisions in Subpart 3474 of this chapter apply to these regulations.

(b) Prior to issuing an exploration license, the authorized officer, after consultation with the Mining Supervisor and, where appropriate, the surface management agency and the surface owner, shall insure that the amount of the bond or bonds to be furnished is sufficient to assure compliance with the terms and conditions of the exploration license, exploration plan and regulations. In no event shall the amount of such bond be less than $5,000.

(c) Upon completion of exploration and reclamation activities that are in compliance with the terms and conditions of the exploration license, the exploration plan, and the regulations, or upon discontinuance of exploration operations and completion of such reclamation as may be needed to the satisfaction of the authorized officer and, where appropriate, the surface management agency, the authorized officer shall terminate the period of liability of the compliance bond. Where the surface of the land being explored is privately owned, the authorized officer shall not terminate the period of liability under the compliance bond until each surface owner has notified the authorized officer, in writing, that the surface has been reclaimed in a satisfactory manner. Should the licensee and any surface owner be unable to agree on the adequacy of the reclamation, the authorized officer shall make the final determination. The period of liability under the compliance bond shall be terminated after it is determined that the terms and conditions and special stipulations of the exploration license, the exploration plan, and the regulations have been met.

§ 3410.4 Use of data.

The licensee shall furnish to the Mining Supervisor copies of all data (including, but not limited to, geological, geophysical, and core drilling analyses) obtained during exploration. The licensee shall submit such data and, where appropriate, the methods by which the data were gathered, at such time and in such form as required by the Mining Supervisor, the authorized officer, or surface management agency, or as specified in this subpart, the license, or the plan. All proprietary data shall be considered confi-

dential and not made public until the areas involved have been leased or until the Mining Supervisor determines that public access to the data would not damage the competitive position of the licensee, whichever comes first. (30 CFR 211.6; 43 CFR 2.20).

§ 3410.5 Use of surface.

(a) A licensee shall be entitled to use for exploration purposes only that surface area of the lands in the exploration license that is authorized in the exploration plan.

(b) Operations under these regulations shall not unreasonably interfere with or endanger operations authorized, under any other Act or regulation.

(c) The licensee shall comply with all applicable Federal, State and local laws and regulations, including the regulations in Group 3000 and Part 3460 of this chapter, and 30 CFR Parts 211 and 741.

PART 3420—COMPETITIVE LEASING

Subpart 3420—Competitive Leasing

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AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C. 351-359; 30 U.S.C. 521-531; 30 U.S.C. 1201 et seq.; 42 U.S.C. 7101 et seq.; 43 U.S.C. 1701 et seq.; and 15 U.S.C. 631-644

Subpart 3420—Competitive Leasing

§ 3420.0-1 Purpose.

This subpart sets forth the procedures for the competitive leasing of rights to extract Federal coal.

§ 3420.0-2 Objectives.

The objectives of these regulations are to establish standards and procedures for considering and, where appropriate, causing development of coal deposits through a leasing system involving land use planning and environmental assessment processes; to ensure that an adequate supply of Federal coal is developed efficiently in compliance with laws, planning processes, and other safeguards designed to protect society and the environment; to ensure that coal deposits are leased at their fair market value; and to ensure that coal deposits are developed in consultation, cooperation, and coordination with the public, State and local governments, and involved Federal agencies.

§ 3420.0-3 Authority.

(a) The regulations in this part are issued under the authority of the statutes cited in § 3400.0-3 of this Group.

(b) The regulations in this Part implement: (1) Primarily Section 2(a) of the Mineral Leasing Act of 1920, as amended by Sections 2 and 3 of the Federal Coal Leasing Amendments Act of 1976 (30 U.S.C. 201(a)); and (2) The Small Business Act of 1953, as amended (15 U.S.C. 631 eq seq.).

§ 3420.0-6 Policy.

All leases except those issued under the provisions of Part 3430 of this chapter shall be issued competitively. There shall be special opportunity lease sales for qualified public bodies and for small businesses. The fair market value determinations for special opportunity lease sales shall be derived in the same manner as for other lease sales. Before each sale, the Department shall evaluate and compare the method or methods of mining that will achieve the maximum economic recovery of the resource. The Department shall receive fair market value for all coal leased.

§ 3420.1 Procedures.

§ 3420.1-1 General.

The competitive leasing program is part of the Federal coal management program and consists of four principal elements: Comprehensive, multiple resource land use planning; establishment of regional leasing targets; specific tract identification, ranking selection, and scheduling; and lease sale. The application of criteria for unsuitability for mining is an integral part of land use planning. All competitive lease sales under this subpart shall be initiated by the Secretary; applications for a competitive lease will be accepted only when filed under the provisions of Subpart 3425 of this chapter.

§ 3420.1-2 Lands subject to evaluation for leasing.

(a) All lands subject to coal leasing under the mineral leasing laws are subject to evaluation under this subpart (43 CFR 3400.2).

§ 3420.1-3 Known recoverable coal resource areas.

No area outside a designated Known Recoverable Coal Resource Area (KRCRA) shall be leased. Each KRCRA shall be formally designated

by publication in the FEDERAL REGISTER.

§ 3420.1-4 Special leasing opportunities.

(a) The Secretary shall, under the procedures established in this subpart, including § 3402.4, reserve and offer a reasonable number of lease tracts through competitive lease sales open only to a restricted class of potential bidders. Except for the limitation on bidding contained in paragraph (b) of this section, all requirements in this Subpart apply equally to special leasing opportunities, including the requirement that coal be leased at its fair market value.

(b) Special leasing opportunities shall be provided for two classes of potential lessees:

(1) Public bodies.

(i) Only public bodies with a definite plan for producing energy for their own use or for their members or customers shall bid for leases designated as special leasing opportunities for public bodies. To qualify as a definite plan, a plan must clearly state the intended use of the coal and have been approved by the governing board of the public body submitting the plan.

(ii) Each public body shall submit evidence of qualification as part of its expression of leasing interest or upon submission of a bid if no expression of interest is made.

(iii) The Secretary may designate certain coal lease tracts as special leasing opportunities for public bodies only if a public body has submitted an expression of leasing interest under § 3420.1-2, requesting that the procedures of this section apply.

(iv) Leases issued under this section to public bodies may be assigned only to other public bodies.

(2) Small businesses.

(i) When necessary to comply with the requirements of the Small Business Act, the Secretary shall designate a reasonable number of tracts for special leasing opportunities for businesses qualifying under 13 CFR Part 121.

(ii) Leases issued under this section may be assigned only to other small businesses qualifying under 13 CFR Part 121.

§ 3420.1-5 Requirement for land use planning.

(a) The Secretary may not issue a lease for coal development unless the lands containing the coal deposits have been included in a land use plan or land use analysis and unless the sale is compatible with, and subject to, any relevant stipulations, guidelines and standards set out in that plan.

(b) Plans for lands administered by the Bureau of Land Management shall be prepared in accordance with the provisions of § 3420.2 of this title.

(c) Plans for lands under the jurisdiction of the Department of Agriculture or any other Federal agency with surface management authority over lands subject to leasing shall be prepared by the surface managing agency, except as provided in the following subsection.

(d) In an area where the Secretary finds either that there is no Federal interest in the surface or that the coal deposits in an area are insufficient to justify the costs of a Federal land use plan, lands may be leased if

(1) The lands have been included in a comprehensive land use plan prepared, authorized or recognized by the state in which the lands are located, which shall govern Federal coal leasing recommendations affecting surface management except for those decisions for which the Secretary is responsible under the Surface Mining Control and Reclamation Act of 1977, and those recommendations that are in conflict with Federal law; or

(2) The lands have been included in a land use analysis completed under the provisions of Group 1600 of this chapter, or, prior to adoption of the regulations comprising Group 1600, a comparable land use analysis under existing procedures.

(e) In the absence of a completed land use plan, a member of the public may petition for a land use analysis for coal related uses of the land as provided for in this group.

§ 3420.2 Land use plans prepared by the Bureau of Land Management.

§ 3420.2-1 Preparation of a land use plan.

The Bureau of Land Management shall prepare resource management plans and land use analyses as provided in Group 1600 of this chapter, or, prior to adoption of the regulations comprising Group 1600, a comparable management plan or land use analysis under existing procedures.

§ 3420.2-2 Coal resource information.

A land use plan shall contain an assessment of the amount of coal recoverable by either surface or underground mining operations or both.

§ 3420.2-3 Areas acceptable for further consideration for leasing.

The major land use planning decision concerning the coal resource shall be the identification of areas acceptable for further consideration for leasing. The areas acceptable for further consideration for leasing shall be identified by the following screening procedures in each subsection below. Each screening procedure shall be applied only to those lands still identified as acceptable for further consideration for leasing after application of the screening procedure in each preceding subsection.

(a) Only those areas subject to evaluation for leasing (§ 3420.1-2) that have high or moderate development potential coal deposits shall be considered acceptable for further consideration for leasing.

(1) This determination shall be based generally on the Geological Survey's Coal Resource Occurrence-Coal Development Potential (CRO/CDP) maps. If CRO/CDP maps are not available, the Geological Survey shall use other available data sources to estimate coal development potential for the land management agency. If other data sources are used, the same criteria for designating coal reserves as high or moderate development potential shall be used.

(2) Coal companies, the State governments, and members of the public may submit non-confidential coal geology and economic data during the earlier inventory phase of planning. Where such information is determined to indicate significant development potential for an area not shown to be of medium or high potential in the CRO/CDP maps, the area shall be considered medium development potential and shall not be excluded from further consideration and application of the remaining screens in the land use planning process.

(b) The authorized officer shall, using the unsuitability criteria and procedures set out in Subpart 3461, review Federal lands to assess where there are areas unsuitable for all or certain types of surface mining operations. Areas considered unsuitable for all types of surface mining operations shall not be acceptable for further consideration for leasing.

(1) On Federal lands administered by the Bureau of Land Management, an unsuitability assessment will be made as part of the land use planning process using both the environmental and resource management criteria of the bureau, including those set out in Subpart 3461, and the reclamation and environmental criteria developed by the Office of Surface Mining Reclamation and Enforcement. This assessment shall be consistent with any decision of the Office of Surface Mining Reclamation and Enforcement to designate lands unsuitable or to terminate a designation in response to a petition.

(2) In cases where land use plans to be used for coal activity planning have been prepared by other Federal agencies or State governments that do not contain an unsuitability assessment, the Secretary shall conduct an assessment. This assessment shall provide opportunity for public comment.

(c) Multiple land use decisions shall be made which may eliminate addi-

tional coal deposits from further consideration for leasing to protect other resources values of a locally important or unique nature not included in the unsuitability criteria discussed in paragraph (b) of this subsection.

(d) While preparing a land use plan, the Bureau of Land Management shall consult with all qualified surface owners, as defined in § 3400.0-5 of this chapter, whose lands overlie coal deposits to determine preference for or against mining by other than underground mining techniques.

(1) Where a significant number of qualified surface owners in an area who have not previously granted any option, preference, or right of first refusal to any other party to mine their land by other than underground mining methods have expressed a preference against mining by other than underground mining techniques, and that area would be considered acceptable for further consideration for leasing only for development by underground mining techniques. In addition, the area may be offered for lease sale for development by other than underground mining techniques if there are no acceptable alternative areas available to meet the regional leasing target.

(2) An area subject to paragraph (d)(1) of this subsection may be considered acceptable for further consideration for leasing for mining by surface underground or surface methods if the number of qualified surface owners who have expressed their preference against mining by other than underground methods is reduced below a significant number because qualified surface owners who expressed their preference against such mining subsequently have given written consent for such mining; (ii) the ownership of the surface estate of qualified surface owners who expressed such a preference is transferred to surface owners who are not qualified surface owners or to qualified surface owners who subsequently provided consent to such mining; or (iii) both (i) and (ii); and the land use plan is amended accordingly.

(3) If any qualified surface owner indicates a firm intent not to give written consent during the expected life of the land use plan to the mining of the coal deposit underlying his surface estate, and signs a written statement that he has not granted any option, preference, or right of first refusal to acquire consent to any other party, that portion of a coal deposit underlying his land, if otherwise considered acceptable for further consideration for leasing as a result of the application of the screen in the preceding subsection, shall be considered acceptable for leasing for development by underground mining methods.

(4) A portion of a coal deposit considered acceptable for leasing for mining by underground methods pursuant to clause (3) may be considered for leasing also by other than underground mining techniques if the ownership of the surface estate is subsequently transferred to a surface owner other than a qualified surface owner or to a surface owner who does not express a firm intent not to provide consent for such mining and if the land use plan is amended.

(e) The land use plan may provide for impact thresholds to manage coal development. Thresholds are pre-specified levels or rates of coal development, measured by impacts on natural, social or economic resources, for the areas assessed as acceptable for further consideration for leasing. Where a threshold exceeded, the Bureau of Land Management may halt, suspend or condition further consideration of the areas acceptable for leasing.

(f) Where the areas acceptable for further consideration for leasing within a planning unit, in the judgment of the local land manager contain more reserves than are likely to be needed for leasing over the life of the plan, the plan may specify broad areas greater than 60,000 acres for earliest consideration for leasing, if any is to be done.

§ 3420.2-4 Hearing requirements.

The Bureau of Land Management shall conduct a public hearing on the proposed land use plan before it is adopted if such a hearing is requested by any person may be adversely affected by the adoption of the plan. A hearing conducted under Group 1600 of this chapter may fulfill this requirement.

The authorized officer conducting the hearing shall: (a) publish a notice of the hearing in a newspaper of general circulation at least once in each of two consecutive weeks in the affected geographical area;

(b) provide an opportunity for testimony by anyone who so desires; and

(c) record the proceedings of the hearing so that a complete transcript of the hearing can be compiled if requested.

§ 3420.2-5 Consultation with Federal surface management agencies.

In situations where another Federal surface management agency administers limited areas overlying Federal coal within the boundaries of a land use plan being prepared by the Bureau of Land Management, the Bureau of Land Management shall consult with the other agency to obtain its recommendations as to the acceptability for further consideration for leasing of the land the other agency administers.

§ 3420.2-6 Consultation with States.

Before adopting a land use plan that makes any formal assessment of lands acceptable for further consideration for leasing, the Bureau of Land Management shall consult with the state Governor and the state agency charged with the responsibility for maintaining the state's unsuitability program (43 CFR 3461.4-1).

§ 3420.2-7 Identification of lands as acceptable for further consideration.

Formal determination that lands are acceptable for further consideration for leasing will be made under Subpart 1600 of this chapter. Any lands determined to be acceptable may be further considered for leasing under § 3420.4 of this Subpart.

§ 3420.3 Regional production goals and leasing targets.

§ 3420.3-1 General.

(a) The coal production regions to which this section applies shall be designated by publication in the FEDERAL REGISTER. They may be changed, or their boundaries altered, by publication in the FEDERAL REGISTER.

(b) The Secretary in consultation with the Secretary of the Department of Energy, affected State Governors, and other concerned parties shall biennially adopt regional coal production goals provided by the Department of Energy adjusted as necessary. The Secretary shall also establish regional leasing targets for the purposes of setting Departmental priorities, aiding the States in planning for potential future impacts of coal development, and supplying the guidance for establishing the amount of coal to be offered through proposed lease sale schedules.

§ 3420.3-2 Evaluation of coal needs.

This section sets out the process the Department shall follow in establishing regional coal needs and appropriate coal management actions.

(a) Proposed regional production goals stating the desired levels of production of coal from various types of coal shall be established by the Department of Energy consistent with the procedures as agreed to by the Secretaries of Energy and of the Interior on production goals for energy resources on Federal lands.

(b) The Secretary shall, within 60 days of receipt of the proposed production goals, review and comment thereon to the Secretary of Energy. The Secretary shall inform the Secretary of Energy of potential policy conflicts or problems concerning, but not limited to: (1) the Department's responsibility for the management, regulation, and conservation of natural resources; (2) the capabilities of Federal

lands and Federal coal resources to meet these goals; and (3) the national need for coal resources balanced against the environmental consequences of developing the resources.

(c) The Secretary of Energy shall issued final production goals not more than 30 days after receipt of the Secretary's comments. In establishing or revising regional lease sale schedules, the Secretary shall be guided by these final production goals of the Department of Energy.

(d) The Department of Energy's final production goals and related production statistics of the Department of the Interior shall be provided to the regional coal teams. Each team shall consider the regional situation and recommend adjustments to the relevant regional production goal based on such factors as (1) public comment received as a result of the publication of the Department of Energy's final regional production goals in the FEDERAL REGISTER, (2) testimony received in hearing(s) held by the team in the region, (3) state government, BLM State Office, regional development policies, (4) administrative capacity to satisfy the indicated level of leasing based on the Department of Energy's final production goals, and (5) other information available to the states and BLM State offices which they believe should receive consideration by the Secretary in his review of the Department of Energy's final regional production goals. Regional teams may also recommend preliminary regional leasing target to the Secretary.

(e) The Secretary shall consider the findings and recommendations of the regional coal teams and other relevant information and review the Department of Energy's final regional production goals to determine whether any adjustments thereto are necessary. The Secretary shall either adopt such goals or make the necessary adjustments thereto and then adopt the goals, as adjusted. Upon adoption of the Department of Energy's final regional production goals, with or without adjustments, such goals, together with the reasons for adjustments, if any, shall be transmitted to the Secretary of Energy and published in the FEDERAL REGISTER.

(f) The Secretary shall also establish preliminary regional leasing targets, based on: the Department of Energy's final regional production targets, as adopted; recommendations of the regional coal teams; and other relevant information. In establishing the preliminary regional leasing targets, at a minimum, the expected and potential production for existing coal leases, noncompetitive coal leases, non-Federal coal holdings, expected non-Federal leasing, the level of competition within the coal region, and the environmental benefits of leasing in the management of the Federal coal resource shall be evaluated. Preliminary regional leasing targets shall reflect the difference between desired levels of production in the region and projected supplies, shall be set out on the basis of reserve coal tonnages, shall be for 4 years, and shall be based on the coal that would come into production as a result of Federal leasing. Consideration shall also be given to the relative economic, social, and environmental differences among the coal regions, the comparative benefits of developing Federal rather than non-Federal coal, and other factors as the Secretary deems appropriate. The preliminary leasing targets shall be published in the FEDERAL REGISTER.

(g) In the process of adopting the Department of Energy's final regional production goals and establishing preliminary regional leasing targets, the Secretary may call a national conference of the regional coal teams to review their recommendations.

(h) In addition to participating in the Secretary's regional hearings on the Department of Energy's final regional production goals, the coal and utility industries, agricultural and community organizations, environmental groups, and other concerned parties shall be afforded the opportunity to submit their views on these goals, as adopted by the Secretary, and on the preliminary regional leasing targets by notice in the FEDERAL REGISTER and, if sufficient requests are received, from the public through additional hearing(s).

(i) The Secretary shall consult with the State Governors seeking their views concerning the Department of Energy's final regional production goals, those goals as adopted by him, and the preliminary leasing targets. The Secretary shall particularly seek the Governors' views regarding the relationship between the preliminary regional leasing targets and potential social and economic effects on the State and region.

(j) Based on the consultation with the State Governors, consideration of the Department of Energy's final regional production goals, as adopted, and the comments received on these goals and the preliminary regional leasing targets, the Secretary shall adopt final regional leasing targets for the guidance of regional coal teams as set out in § 3420.3-3 of this title.

(k) Two years after the adoption of each new regional lease sale schedule, the Secretary shall review the final regional leasing target which applies to that schedule through the process set out in paragraphs (b) through (j) of this section and, if necessary, revise the final regional leasing target for the final 2 years of the sale schedule.

(l) The initial regional leasing targets established for the first regional lease sales may be established by the Secretary based on the analysis presented in the final Environmental Statement, Federal Coal Management Program, and related analyses without regard to the provisions of paragraphs (a) through (j) of this section

§ 3120.3-3 Use of final regional leasing targets.

(a) The final regional leasing targets shall guide the regional coal team in the preliminary delineation, ranking, selection and scheduling of tracts for lease sale in the coal production regions.

(b) The final regional leasing targets do not represent final leasing decisions and may, with the approval of the Secretary, be revised by the regional coal teams as a result of consideration of national needs and social, economic, and environmental factors that are taken into account during the tract ranking, selection, and scheduling process. Circumstances justifying a revision of a final regional leasing target may include, but not be limited to, the following:

(1) Expressed industry interests in coal development in the region not reflected in the final regional leasing target;

(2) Expressed interests and rationale thereof from a community or group of communities for coal development in the adjacent and surrounding areas;

(3) Expressed interests for special opportunity sales;

(4) Adjustments indicated by the success or failure of the scheduled lease sales in meeting the final regional leasing targets;

(5) An expressed desire on the part of the state or local government to shift or disperse development patterns in the region or sub-region by additional leasing, reductions in leasing, or shifts in locations of lease sales; and

(6) Results from the analyses contained in the regional lease sale environmental statement.

(c) In any case, one alternative shall be analyzed in the regional lease sale environmental statement that represents the applicable final leasing target established pursuant to § 3420.3-2(j).

(d) Where a regional coal team elects to propose a revision of the relevant final regional target during the selection of tracts proposed for lease sale and the design of the recommended regional sale schedule, the team shall clearly set out the proposed revision and the reasons therefor in the regional sale environmental statement and request public comment on the proposed revision in the public participation process for the regional lease sale environmental statement. Such a

proposed revision shall not become effective unless and until the Secretary approves the recommended alternative leasing target and schedule.

§ 3420.3-4 Environmental assessment.

An environmental assessment in the form of an updating of the coal programmatic environmental statement shall be conducted by the Secretary if he:

(a) determines that the regional production goals and regional leasing targets established in accordance with §§ 3420.3-2(e) and 3420.3-2(j) vary significantly from those analyzed in the most current version of the coal programmatic statement, or

(b) has reason to believe that the tracts available for selection in the next round of the tract ranking, selection, and scheduling process (Section 3420.4-4) in any given region(s) may generate significantly different levels or types of environmental impacts than were anticipated in the most current coal programmatic environmental statement.

§ 3420.4 Activity planning—The leasing process.

§ 3420.4-1 Area identification process.

This section describes the process for identifying, ranking, selecting, and scheduling lease tracts after land use planning has been completed. This process constitutes the "activity planning" aspect of the coal management program. Activity planning may occur (a) where areas acceptable for further consideration for leasing have been identified in the Bureau of Land Management's land use planning process or (b) where the surface management agency or State has completed acceptable planning under § 3420.1-5 of this title. Activity planning may also occur where coal leasing and development is consistent with land use plans completed prior to the adoption of this group 3400 of this title that have been supplemented by the application of the unsuitability criteria in accordance with subpart 3461 of this title and consultation with the surface owners in accordance with § 3420.2 of this title.

§ 3420.4-2 Expressions of leasing interest.

(a) A call for expressions of leasing interest may be made after areas acceptable for further consideration for leasing have been identified through the Bureau of Land Management's land use planning process. A call for expressions of leasing interest may also be made in other areas having acceptable planning completed by other surface management agencies or state governments under the provisions of § 3420.1-5 of this title. The call may be made in any one, several, or all of the above mentioned areas when the Secretary determines, using the regional production goals and regional leasing targets established under § 3420.4-1 of this title, that additional federal coal leasing may be needed to meet local, state, or national needs in the foreseeable future.

(b) The expressions of leasing interest process provided for in this Subpart is not exclusive. Any individual, business entity, governmental entity, or public body may participate in the general public participation opportunities and procedures that are part of the land use planning process which precedes the call for expressions of leasing interest.

(c) Entities qualifying for special leasing opportunities as defined in § 3420.1-4 of this title shall make their intentions known through submission of expressions of leasing interest when called for by the Secretary.

(d) Any expressions of leasing interest may include supportive nonproprietary data. Such data may include, but are not limited to, location and quantities of coal desired, time frames, proposed use of coal, technical coal data, commitment with private surface and coal owners and adjacent land owners or lessees, and basic development proposals. Expressions which identify quantity and quality of coal and timing of need without specifying a location shall be given as serious consideration in activity planning as those that specify a location. Data which are considered proprietary shall not be submitted as part of an expression of leasing interest.

(e) Public inspection and copying of information submitted under this subpart shall be governed by the procedures in part 2 of this title.

(f) Each call for expressions of leasing interest shall be published as a notice in the FEDERAL REGISTER and in at least one newspaper of general circulation in each affected state. This notice of request shall specify the area or areas involved, information required, the time period within which expressions may be submitted, where to write for further information, and where to submit the expressions.

§ 3420.4-3 Preliminary tract delineation.

(a) Preliminary tracts shall be delineated for analysis during ranking, selection, and scheduling. The preliminary tracts may include non-Federal as well as Federal coal reserves and may include existing mining operations.

(b) In addition to expressions of leasing interest, factors to be considered in delineating preliminary tracts may include but are not limited to:

(1) Technical coal data, including reserve tonnage, rank, sulfur content, seam thickness, and ratio of overburden to recoverable coal;

(2) Conservation considerations, including preliminary calculation of maximum economic recovery, land ownership patterns, and the potential formation of logical mining units; and

(3) Surface ownership, including qualified surface owners' preferences expressed in consultation during land use planning, and the existence of written surface owner consents and their terms.

(c) The potential tracts shall be delineated in accordance with § 3471.1-2 of this title and by seam(s) or coal bed(s). More than one potential tract may be delineated for a specific coal bed or potential mining unit.

(d) When potential public bodies have submitted expressions of leasing interest, tracts to meet those needs shall be delineated when and where technically feasible for public body special leasing opportunities in accordance with § 3420.1-4 of this title.

(e) In cooperation with the Small Business Administration, tracts may be delineated when and where technically feasible for small business special leasing opportunities in accordance with § 3420.1-4 of this title.

(f) Other tracts to be used in a lease or fee exchange (43 CFR Subparts 3435, 3436, and 3437) may be delineated.

(g) A tract profile shall be formulated for each preliminary tract. The profile shall include:

(1) A summary of the information used in the delineation of the tract, and

(2) A site-specific environmental inventory and preliminary analysis.

(h) The regional coal team shall determine the location, priority, and timing of both preliminary tract delineation and site-specific environmental inventory and analysis, subject to limitations of data availability, budget, and manpower.

§ 3420.4-4 Regional tract ranking, selection, and scheduling.

(a) If the final regional leasing target established for any given region suggests a need for additional Federal coal leasing, tracts shall be ranked and a proposed lease sale schedule shall be prepared pursuant to this section. Tracts may also be ranked for other coal management purposes.

(b)(1) The ranking classes shall be those of high medium and low desirability. In ranking the tracts three major data categories shall be considered: coal economics, natural environment, and socioeconomic. The list of subfactors to be considered under each category shall be those determined by the regional coal team as appropriate for that region. The regional coal team may defer the ranking of any given preliminary tract for which they

determine there is generally insufficient data.

(2) The regional coal team shall solicit the recommendations of Federal and State agencies having appropriate expertise. These Federal agencies shall include but are not limited to the Department of Energy, the Fish and Wildlife Service, the Geological Survey, and the Office of Surface Mining, and any Federal agency that administers the surface of any lands in a preliminary tract.

(c) Upon completion of tract ranking, the regional coal team shall select tracts for inclusion in alternative proposed lease sale schedules or for other management purposes to be forwarded to the Secretary for final selection.

(1) The total of the coal reserves included in the selected tracts in the proposed lease sale schedules shall be based on the applicable final regional leasing target established under the provisions of § 3420.3 of this title.

(2) The regional coal team shall select tracts for scheduling based on tract ranking as adjusted using the following considerations: (i) the compatibility of coal quality and market needs; (ii) cumulative environmental and socioeconomic impacts; (iii) the compatibility of reserve size and demand distribution for tracts; (iv) public opinion; (v) avoidance of future by-pass situations; and (vi) special leasing opportunity requirements.

(3) The regional coal team shall identify all those combinations of tracts which they feel may be equally desirable to meet the applicable final regional target. In addition to tract combinations designed to meet the leasing target, the team may recommend tract combinations representing alternative leasing targets based on impact assessment or revised regional coal demand assessments, but the reasons for all such recommendations must be thoroughly documented.

(d) A notice of intent to rank tracts shall be published in the FEDERAL REGISTER and selected newspapers of general distribution within the region no less than 30 days before the ranking process begins. The notice shall contain a description of the tracts to be ranked and procedures under which any interested parties may become involved in the process.

(e) The results of the process, including the tract rankings, the tracts selected, the proposed schedule, and the list of ranking criteria used shall be published in the regional lease sale environmental statement prepared on the tract ranking, selection, and scheduling process (Section 3420.4-5). Detailed information on each of the tracts ranked will be available for inspection in the Bureau of Land Management State offices that have jurisdiction within the region (43 CFR Subpart 1821). Those parties interested in commenting on the results of the tract ranking, selection and scheduling process shall have the opportunity to do so in the environmental statement process, prior to any final decision by the Secretary to adopt a regional sale schedule including any of the selected tracts.

(f) Upon the close of the comment period on the draft environmental statement the regional coal team shall analyze the comments and make any revisions in the ranking, selection and scheduling analysis they feel are necessary. The team shall then forward their final recommendations of alternatives for a regional leasing schedule to the Secretary.

(g) The tract ranking, selection, and scheduling process shall normally be repeated every four years with an update performed ever two years in accordance with any need identified by the regional production goal and regional leasing target. The Secretary may, in consultation with the Governor(s) of the affected States and surface management agencies, initiate or postpone the process to respond to considerations such as major planning updates, new preliminary tract delineations, and increases or decreases in regional leasing targets.

§ 3420.4-5 Environmental assessment. (a) **In conjunction with the tract ranking, selection, and scheduling process, a regional environmental statement of the proposed alternative lease sale schedules shall be prepared in accordance with the provisions of the National Environmental Policy Act of 1969. The statement shall consider both:**

(1) The site-specific potential environmental impacts of each tract being considered for lease sale; and

(2) The intraregional cumulative environmental impacts of the proposed leasing action and alternatives, and other coal development activities.

(b) The regional lease sale environmental statement prepared for the original regional lease sale schedule shall be updated if the Department makes any significant alterations to that schedule not considered in the original environmental statement.

§ 3420.4-6 Public meetings on proposed tracts.

After the draft regional lease sale environmental statement has been completed on alternative lease sale schedules, a public meeting shall be held in the region affected to announce the results of the ranking, selection, and scheduling process; the alternative lease sale schedules; and the potential impacts, including proposed mitigation measures.

§ 3420.5 Final consultations.

§ 3420.5-1 Timing of consultation.

Following the release of the final regional lease sale environmental statement, and prior to adopting a regional lease sale schedule, the Secretary shall formally consult with the Governors of those States within which lease sales are under consideration, and with any surface management agency other than the Interior Department which administers lands overlying any lease tract under consideration.

§ 3420.5-2 Consultation with surface management agencies.

(a) The Secretary, for any proposed lease tract containing lands the surface of which is under the jurisdiction of any agency other than the Department of the Interior, shall request that the agency: (1) consent, if it has not already done so, to the issuance of the lease (43 CFR 3400.3-1), and (2) if it consents, prescribe the terms and conditions the Secretary will impose in any lease which the head of the agency requires for the use and protection of the nonmineral interests in those lands.

(b) The Secretary may prescribe additional terms and conditions that are consistent with the terms proposed by the surface management agency to protect the interest of the United States and to safeguard the public welfare.

§ 3420.5-3 Consultation with Governors.

(a) The Secretary shall consult the Governor of the State in which any proposed lease tract is located. The Secretary shall give the Governor a specified period of time to comment, not less than 30 days nor more than 60 days, before issuing a final decision regarding any potential lease sale within the state.

(b) When a lease proposal would permit surface mining within the boundaries of a National Forest, the Governor of the State in which the land to be leased is located shall be so notified by the Secretary. If the Governor fails to object to the lease proposal in 60 days, the Secretary may adopt a sale schedule including that tract. If, within the 60 day period, the Governor, in writing, objects to the lease proposal, the Secretary may not hold the sale for that lease tract. Issuance of the lease will be held in abeyance for six months from the date that the Governor objects to the lease. The Governor may, during this six-month period, submit a written statement of reasons why the lease sale should not be held or the lease issued, and the Secretary shall, on the basis of this statement, reconsider the lease proposal.

§ 3420.6 Qualified surface owner consent considerations.

§ 3420.6-1 Receipt of written consent.

Prior to making a final decision on a regional lease sale schedule, the Secretary shall give consideration to what acceptable written consents have been received for those potential lease sale tracts under consideration for inclusion in the regional lease sale schedule. The Secretary's considerations shall be given in accordance with the split estate leasing provision of section 3427 of this title.

§ 3420.6-2 Announcement of tracts under consideration.

Following the release of the final regional lease sale environmental statement, the Secretary shall publish an announcement in the FEDERAL REGISTER containing:

(a) A legal description of all tracts under consideration for inclusion in the regional lease sale schedule, and

(b) the deadline for anyone to submit a written consent for any tract under consideration by the Secretary for selection for inclusion in the regional lease sale schedule.

§ 3420.6-3 Consideration of consents.

The Secretary shall, pursuant to § 3427.2, take the existence of written consents into consideration in making his decision on the final regional lease sale schedule. All other ranking, selection, and scheduling factors being nearly equal, those tracts for which acceptable written consents have been received shall be chosen for inclusion in the regional coal lease sale schedule over those for which no acceptable written consents have yet been received.

§ 3420.7 Adoption of final regional lease sale schedule.

§ 3420.7-1 Announcement.

Following completion of the requirements of §§ 3420.5 and 3420.6 of this title the Secretary shall announce a final regional lease sale schedule. The announcement shall be published in the FEDERAL REGISTER and contain a legal description of each tract included in the lease sale schedule and the date when each tract has been tentatively scheduled for sale.

§ 3420.7-2 Revision.

(a) The Secretary may revise either the list of tracts included in the schedule or the timing of the lease sales in accordance with any alternatives considered in the regional lease sale environmental statement and during consultation with the Governors and other surface management agencies if such revision would be in the public interest. Notice of any such revision shall be published in the FEDERAL REGISTER.

(b) Any regional lease sale schedule may be updated or replaced as a result of a new regional tract ranking, selection, and scheduling effort conducted in accordance with the provisions of § 3420.4-4 of this title.

Subpart 3422—Lease Sales

§ 3422.1 Economic evaluation.

§ 3422.1-1 Mineral evaluation and initial comments on fair market value and maximum economic recovery.

After announcement of the regional lease sale schedule, the authorized officer shall:

(a) Solicit public comment on the fair market value of the tract or tracts to be offered. Such solicitation shall present the standards and procedures that guide the Government's appraisal and ask for comments on these items which affect the appraisal such as the terms and conditions of similar market transactions, the quality and extent of the coal resource, the price that the mined coal would bring in the market place, the cost of producing the coal, the interest rate at which anticipated income streams should be discounted, the value of the surface estate (if private surface), the mining method or methods which would achieve maximum economic recovery of the coal and any other items which might affect the appraisal of the tract or tracts. Such comments will be solicited for a period of 30 days. The authorized officer shall forward copy of all comments to the USGS.

(b) Request from the Geological Survey an evaluation including a coal resource economic value (CREV) and a maximum economic recovery (MER) determination. The CREV includes the consideration of coal quality, quantity, and marketability, probable mining methods, costs, prices, preliminary logical mining units, and other appropriate elements. Prior to issuance of the sale notice, the Geological Survey shall forward this evaluation to the authorized officer. This evaluation shall include the coal resource economic value, mining method evaluation, estimated recoverable reserves by seam, MER determination, coal quality assessment, royalty and compliance bond recommendations; an estimate of reclamation fees that would be generated by mining the proposed lease; and public comments on fair market value and maximum economic recovery.

§ 3422.1-2 Estimated fair market value determination.

When the authorized officer receives the mineral evaluation and accompanying information, he shall estimate the fair market value of the coal deposits and the proposed lease. Minimum bonus bids shall be not less than $25 per acre. The estimated fair market value, minimum acceptable bid, deferred bonus and other financial terms and requirements shall be the same for special opportunity, emergency, and regular competitive leasing. When the estimated fair market value has been determined, the authorized officer shall inform the Geological Survey of the determination.

§ 3422.2 Notice of sale.

(a) Prior to the lease sale, the authorized officer shall publish a notice of the proposed sale in the FEDERAL REGISTER and in a newspaper(s) of general circulation in the county or equivalent political subivision in which the tracts to be sold are situated. The newspaper notice shall be published once a week for four consecutive weeks. Such notice shall also be posted in the Bureau of Land Management State Office and mailed to any affected surface owner. The lease sale shall not be held until at least 30 days after such posting.

(b) The notice shall:

(1) List the time and place of sale, the type of sale, bidding method, and the description of the tract(s) being offered and minimum acceptable bid to be considered;

(2) Contain a request for final comments on the fair market value of the tract(s) and maximum economic recovery and state the address for submitting the comments and;

(3) Contain information on where a detailed statement of the terms and conditions of the lease(s) which may result from the lease sale may be obtained.

(c) The detailed statement of the terms and conditions of the lease(s) sale offered for sale shall:

(1) Contain an explanation of the manner in which the bids may be submitted;

(2) Contain a statement that, if sealed bids are submitted, they may not be modified or withdrawn unless the modifications or withdrawals are received prior to the time fixed for opening the bids;

(3) Contain a statement that, if the sale is by oral bid, sealed bids may also be submitted;

(4) Contain a warning to all bidders concerning 18 U.S.C. 1860, which prohibits unlawful combination or intimidation of bidders;

(5) Specify that the Secretary reserves the right to reject any and all bids and the right to offer the lease to the next highest qualified bidder if the successful bidder fails to obtain the lease for any reason;

(6) Specify that if any bid is rejected, any deposit shall be returned;

(7) Contain a notice that each bid shall be accompanied by the bidder's qualifications (43 CFR 3472.2-2);

(8) Contain a notice to bidders that the winning bidders shall have to submit the information required by the Attorney General for post-sale review (43 CFR 3422.3-4);

(9) Require the bidder to pay one fifth of the bonus bid;

(10) If appropriate, contain a copy of any written consent given by a qualified surface owner and its terms, including payments which the high bidder, if not the holder of the consent, will have to make; and

(11) If appropriate, contain a notice that bidders shall file a statement that all information they hold relevant to written consents affecting any area offered in the sale in which the bid is submitted has been filed with the proper Bureau of Land Management State Office (43 CFR Subpart 1821) in accordance with the provisions of subpart 3427 of this title.

(d) The successful bidder, if any, shall reimburse the Government for the cost of publishing the notice of sale as a condition of lease issuance.

(e) After the lease sale notice is published and the final public comments on fair market value and maximum economic recovery are received, these comments shall be forwarded to the Geological Survey for consideration in the final mineral evaluation, which will be presented to the authorized officer at the convening of the sale panel.

§ 3422.3 Sale procedures.

§ 3422.3-1 Conduct of sale.

(a) Sealed bids shall be received only until the hour on the date specified in the notice of competitive leasing; all bids submitted after that hour shall be returned. The authorized officer shall read all sealed bids. If the announced procedure is to receive sealed bids followed by oral bids, the authorized officer conducting the sale shall open and read the sealed bids, after which the oral bidding shall begin at the level of the highest sealed bid. Only those submitting sealed bids may offer oral bids. After the oral bidding has ceased, the highest bid shall be announced. No decision to accept or reject the high bid will be made at this time.

(b) A sale panel shall convene to determine: (1) if the high bid was properly submitted; (2) if it reflects the fair market value of the tract; and (3) whether the bidder is qualified to hold the lease. The recommendations of the panel shall be sent to the authorized officer who shall make the final decision to accept a bid or reject all bids. The successful bidder shall be notified in writing. The Department reserves the right to reject any and all bids regardless of the amount offered, and shall not accept any bid that is less than fair market value. The authorized officer shall notify any bidder whose bid has been rejected and include in such notice a statement of the reason for the rejection. The Department reserves the right to offer the lease to the second high bidder if the successful bidder fails to execute the lease, or is for any reason disqualified from receiving the lease.

(c) Each sealed bid shall be accompanied by a certified check, cashier's check, bank draft, money order, personal check or cash for one-fifth of the amount of the bonus, and a qualifications statement over the bidder's own signature with respect to citizenship and interests held, as prescribed in § 3472.2-2 of this title. A high oral bidder shall tender by certified check, cashier's check, bank draft, money order, personal check or cash at the close of bidding any additional amount necessary to bring the amount tendered with his sealed bid up to one fifth of his oral bid.

§ 3422.3-2 Other bidding systems.

(a) The use of intertract bidding competition is authorized when, and if, the Bureau of Land Management and the Geological Survey in consultation with the Department of Energy determine it is needed in the public interest. The authorization to use intertract bidding competition does not preclude the use of any other form of competitive bidding procedures. Tracts including nontransferable, written consent from a qualified surface owner given prior to August 3, 1977, shall be offered only in a sale using intertract bidding competition.

(b) In intertract bidding competition, the winning bidders, if any, are selected by determining first the tract with the single highest bid per ton of reserves among all tracts, then the tract with the second highest bid and so forth. The bids may be weighted to compensate for differences in the physical quality of the coal in such tracts. If leases are awarded they shall be awarded for tracts proceeding in this sequence until the total reserve tonnage sought to be leased in that sale has been reached. Tracts receiving lower bids per ton shall not be leased as a result of a bid submitted in that sale.

§ 3422.3-3 Unsurveyed lands.

If the land is unsurveyed, the successful bidder shall not be given 30 days notice to comply with the requirements of § 3422.4 of this title for lease issuance until the land has been surveyed under § 3471.1-2 of this title (See 43 CFR 3471.1-2.)

§ 3422.3-4 Consultation with Attorney General.

(a) Subsequent to a lease sale, but prior to issuing a lease, the authorized officer shall require the successful bidder to submit the information set out in this subsection relating to the bidder's coal holdings to the authorized officer for transmittal to the Attorney General. Upon receipt of the information, the authorized officer shall notify the Attorney General of the proposed lease issuance, the name of the successful bidder, and the terms of the proposed lease. The statement of coal holdings that the authorized officer will transit shall include the following best available information required by the Attorney General for each coal tract or deposit controlled by the bidder.

(1) Location of the tract or deposit by county and state (and by public land survey subdivisions if applicable);

(2) Whether the deposit is Federally or non-Federally owned;

(3) Interest held by bidder (if Federal, lease or lease application number; if non-Federal, a statement of the nature of the interest—owner, lessee, operator, joint venturer);

(4) Surface ownership of the tract;

(5) If the surface is owned by other than bidder, nature of agreement with the surface owner if any;

(7) Reserves broken down: (i) by tonnage and acreage; and (ii) into reserves minable by surface and underground mining methods;

(8) BTU content or rank of the coal; and

(b) Any successful bidder who has previously submitted a statement of coal holdings may file a statement incorporating the prior statement by reference to the date and proposed lease or lease application serial number, and containing any and all changes in holdings since the date of the prior submission.

(c) The authorized officer may not issue a lease until 30 days after the Attorney General receives the notice and statement of the successful bidder's coal holdings. If the Attorney General notifies the authorized officer that the statement of coal holdings is incomplete or inadequate, the 30-day period shall stop running on the date of such notification and not resume running until the Attorney General receives the supplemental information.

(d) The authorized officer shall not issue the lease to the successful bidder if, during the 30-day period, the Attorney General notifies the authorized officer that lease issuance would create or maintain a situation inconsistent with the antitrust laws.

(e) If the Attorney General notifies the authorized officer that a lease should not be issued, the authorized officer may:

(1) Reject all bids or may notify the Attorney General in accordance with paragraph (a) of this section that issuance of the proposed lease to the next qualified high bidder is under consideration; or

(2) Issue the lease if, after a public hearing is conducted on the record in accordance with the Administrative Procedure Act, the authorized officer determines that: (i) issuance of the lease is necessary to carry out the purposes of the Federal Coal Leasing Amendments Act of 1976; (ii) issuance of the lease is consistent with the public interest; and (iii) there are no reasonable alternatives to the issuance of the lease consistent with the Federal Coal Leasing Amendments Act of 1976, the anti-trust laws, and the public interest.

(f) If the Attorney General does not reply in writing to the notification in paragraph (a) of this section within 30 days, the authorized officer may issue a lease without waiting for the advice of the Attorney General.

§ 3422.4 Award of lease.

(a) After the authorized officer has accepted a high qualified bid and notified the successful bidder, and the Attorney General has not objected to lease issuance or the procedures in § 3422.3-4(e) have been completed, the authorized officer shall send four copies of the lease form to the successful bidder. These forms shall be completed, signed, and returned within 30 days of receipt. In addition, the bidder shall, within the 30-day period, pay the balance of the bonus bid, if required, pay the first year's rental, and file a compliance bond as required by Subpart 3474 of this chapter. Upon receipt of the above, the authorized officer shall execute the lease.

(b) If the successful bidder dies before the lease is issued, the provisions found in § 3472.2-4 of this title shall apply.

(c) At least half of all competitive coal lease sales shall be held on a deferred bonus payment basis. In a deferred bonus payment, the lessee shall pay the bonus payment in 5 equal installments; the first installment shall be submitted with the bid. The balance shall be paid in equal annual installments due and payable on the next four anniversary dates of the lease. If a lease is relinquished or otherwise cancelled or terminated, the unpaid remainder of the bid shall be immediately payable to the United States.

Subpart 3425—Emergency Leasing

§ 3425.0-1 Purpose.

This subpart sets forth the regulations for the emergency leasing of Federal coal.

§ 3425.0-2 Objective.

The objective of this subpart is to provide an application process through which the Department may consider holding lease sales apart from the normal competitive leasing process (Sections 3420.4 through 3420.7) where an emergency need for unleased coal deposits is demonstrated.

§ 3425.0-6 Policy.

Leasing proposals developed by this application process differ from those that originate through the normal leasing process only with respect to (a) the method of tract delineation and (b) the manner in which the planning and environmental assessment process will be completed. Only as much of a coal deposit as is necessary to meet the need of the emergency lease applicant without compromising the normal leasing process shall be offered.

§ 3425.1 Application for emergency lease.

§ 3425.1-1 Where filed.

Application for an emergency lease covering lands subject to leasing (43 CFR 3400.2) shall be filed in the Bureau of Land Management State Office having jurisdiction over the lands or minerals involved (43 CFR Subpart 1821).

§ 3425.1-2 Form.

An application for an emergency lease shall be filed on a form approved by the Director, Bureau of Land Management. Three copies of the application and preliminary and other data required by this subpart shall be filed. The application must be accompanied by the filing fee (43 CFR 3473.2).

§ 3425.1-3 Qualifications of the applicant.

Any applicant for an emergency lease shall meet the qualifications required of a lessee as specified in subpart 3472 of this title.

§ 3425.1-4 Emergency leasing criteria—existing operations.

(a) An emergency lease sale may be held in response to an application under this Subpart if the applicant can show:

(1) That the application involves an existing mining operation that has been producing coal for at least two years before the date of application, and either: (i) the Federal coal is needed within three years to maintain an existing mining operation at the average annual level of production, as substantiated by the proposed production levels stated in a mining plan, or new contracted level of production on the date of application, as substantiated by a complete copy of the supply or delivery contract, or both; or (ii) if the coal deposits are not leased they shall be bypassed in the reasonably foreseeable future, and if leased, some portion of the tract applied for shall be used within three years, as substantiated by the proposed production levels stated in a mining sequence plan; and

(2) That the need for the coal deposits shall have resulted from circumstances that were beyond the control of the applicant or that he could not have reasonably foreseen and planned for.

(b) The extent of any lease issued under this section shall not exceed 8 years of coal reserves at the average annual production level or new contracted level of production on the date of the application.

§ 3425.1-5 Emergency leasing criteria—Hardship cases.

An emergency lease sale may be held in response to an application under this Subpart if the applicant can show that the application involves coal deposits that are needed to avoid significant hardship to the lease applicant or users of the coal.

(a) The application shall show that the coal deposits are unlikely to be delineated or scheduled for sale in the normal competitive system because:

(1) They are outside a coal production region estalished pursuant to § 3420.3-1(a);

(2) They are inside a coal production region in which activities pursuant to § 3420.4 have yet to be commenced; or

(3) They are of a size, quality or end use that is not significantly related to meeting the regional leasing target.

(b) The application shall show hardship of the following type:

(1) A locality has lost or will lose its alternative sources of domestic coal supply;

(2) A mine which has been closed will be reopened, and local unemployment will be alleviated;

(3) The mine will test new technology whose development is supported by a Federal agency;

(4) Mining and reclamation of the tract will promote a program or policy of another surface management agency, such as rehabilitation of lands scarred by past uses; or

(5) Similar reasons that the Secretary determines substantially in the public interest after allowing opportunity for public hearing and considering the comments therein.

(c) The Secretary may issue a lease under this subpart to any applicant listed in the modified court order in *NRDC* v. *Hughes*, 454 F. Supp. 148 (D.D.C. 1978).

§ 3425.1-6 Preliminary data.

(a) Any application for an emergency lease shall contain preliminary data to assist the authorized officer in

making an environmental assessment as described in § 3430.3-1 of this title.

(b) Such preliminary data shall include:

(1) A map, or maps, (which may be available from state or Federal sources) showing the topography, physical features and natural drainage patterns, existing roads, vehicular trails, and utility systems; the location of any proposed exploration operations, including seismic lines and drill holes; to the extent known, the location of any proposed mining operations and facilities, trenches, access roads or trails, and supporting facilities including the approximate location and extent of the areas to be used for pits, overburden, and tailings; and the location of water sources or other resources that may be used in the proposed operations and facilities.

(2) A narrative statement, including:

(i) The anticipated scope, method, and schedule of exploration operations, including the types of exploration equipment to be used;

(ii) The method of mining anticipated, including the best estimate of the mining sequence and production rate to be followed;

(iii) The relationship between the mining operations anticipated on the lands applied for and existing or planned mining operations, or support facilities on adjacent Federal or non-Federal lands;

(iv) A brief description, including maps or aerial photographs, as appropriate, of: the existing land use within and adjacent to the lands applied for; known geologic, visual, cultural, or archaeological features; and known habitat of fish and wildlife—particularly threatened and endangered species—any of which may be affected by the proposed or anticipated exploration or mining operations and related facilities;

(v) A brief description of the proposed measures to be taken to control or prevent fire and to mitigate or prevent soil erosion, pollution of surface and ground water, damage to fish and wildlife or other natural resources, air and noise pollution, adverse impacts to the social and infrastructure systems of local communities, and hazards to public health and safety; reclaim the surface; and meet other applicable laws and regulations. The applicant may submit other pertinent information that the applicant wishes to have considered by the authorized officer;

(vi) A statement which describes the intended use of the coal covered by the emergency application; and

(vii) Any other information which will show that the application meets the requirements of this subpart.

(c) The applicant shall not undertake any mining operations on the land except for casual use, without prior authorization by exploration license. Casual use excludes activities that cause significant surface disturbance or damage to lands, resources, and improvements, such as the use of heavy equipment, explosives, or any off-road vehicle that could disturb the land. Determination of significant surface disturbance or damage shall be made by the authorized officer.

(d) The authorized officer, after reviewing the preliminary data contained in an application, and at any time during an environmental assessment may request additional information from the applicant. Where the surface of the land is held by a qualified surface owner (Section 3400.0-5) and the mining method to be used is other than underground mining techniques, the authorized officer shall obtain documents necessary to show ownership of surface. The applicant shall submit evidence of written consent from any qualified surface owner(s). (See 43 CFR Subpart 3427).

§ 3425.1-7 Rejection of applications.

(a) An application for an emergency lease shall be rejected in total or in part when the authorized officer determines that: (1) The application is not consistent with conditions for holding a lease sale specified in § 3425.1-3 of this title; (2) the lands listed in the application are not available for coal leasing under § 3400.2 of this title; (3) the lands applied for are assessed to be unsuitable for leasing under the provisions of subpart 3461 of this title, or lie within an identified area of critical environmental concern; (4) the applicant cannot qualify as defined in § 3425.1-2 of this title to hold a lease under this subpart; (5) preliminary data required under § 3425.1-5 of this title, including additional information specifically requested in writing by the authorized officer, are found to be insufficient to determine whether the application meets the conditions for emergency leasing, and to complete the environmental assessment satisfactorily; (6) the lease would violate the integrity of the normal leasing process; or (7) after thorough investigation of the issues involved, leasing of the lands covered by the application, for environmental or other sufficient reasons, would be contrary to the public interest.

(b) Any application subject to rejection under paragraph (a)(5) of this section shall not be rejected until the applicant is given written notice of the opportunity to provide requested missing information and fails to do so within the time specified in the decision issued for that purpose.

§ 3425.2 Land use plans.

No emergency lease shall be issued under this subpart unless the lands have been included in a comprehensive land use plan or a land use analysis, as required in § 3420.1-5 of this title. The decision to issue an emergency lease shall be consistent with the appropriate land use plan or analysis.

§ 3425.3 Environmental assessment.

(a) Before an emergency lease sale may be held the authorized officer shall conduct an environmental assessment of the proposed lease area and prepare an environmental assessment record.

(1) The environmental assessment shall include:

(i) An evaluation of direct and indirect potential impacts including cumulative impacts of coal leasing and development upon the physical and socio-economic environment of the proposed lease area and adjacent areas that may be affected;

(ii) An evaluation of the technical and natural potential for successful reclamation on the proposed lease area; and

(iii) An evaluation of all reasonable alternatives to leasing the area or to any known plans of operation for the proposed area.

(2) The environmental assessment record shall be prepared containing recommendations and special stipulations regarding:

(i) Lands that should be excluded from the proposed areas to avoid unacceptable environmental or special impacts, including those lands to be excluded as identified through the application of the unsuitability criteria in subpart 3461 of this title.

(ii) Any specific measures required to avoid or mitigate adverse impacts to, or to reclaim areas that may be acceptable for leasing and development, including measures to assure appropriate post-mining land use and measures to prevent irreparable damage or destruction of unique environmental values that are identified through the application of the unsuitability criteria in subpart 3461 of this title.

(3) If, based upon the environmental assessment record prepared under (2), the authorized officer determines that an environmental statement is required under the National Environmental Policy Act of 1969, either a statement shall be prepared under 40 CFR 1500, or the authorized officer may determine that because of critical environmental considerations under § 3425.1-6(a)(7) of this title.

(4) If, based upon the environmental assessment record prepared under (2), the authorized officer determines that an environmental statement is not required under the National Environmental Policy Act of 1969, a finding of no significant impact shall be pre-

pared and issued in accordance with 40 CFR 1501.4 and 1506.6.

(b) For lease applications involving lands in the National Forest System, the authorized officer shall submit the lease application to the Secretary of Agriculture for consent, for completion of an environmental assessment and for the attachment of appropriate lease stipulations, and for the making of any other findings prerequisite to lease issuance. (43 CFR 3400.3-3).

§ 3425.4 Consultation and sale procedures.

(a) The following sections of subpart 3420 of this title shall apply to all leases offered for sale under the provisions of subpart 3425:

(1) Section 3420.4-6;

(2) Section 3420.5-1; and

(3) Section 3420.5-2.

(b)(1) Subpart 3422 of this title applies in full to any sale to be held in response to an application filed under subpart 3425 of this title.

(2) In addition to the requirements set forth in § 3422.2 of this title, the successful bidder must meet the emergency leasing criteria (See § 3425.1-3).

§ 3425.5 Diligence and other lease terms.

Diligent development and continued operation shall be required on all emergency leases consistent with the provisions governing other competitive leases (See 43 CFR 3400.0-5).

Subpart 3427—Split Estate Leasing.

§ 3427.0-1 Purpose.

The purpose of this subpart is to set out the protection that shall be afforded qualified surface owners of split estate lands (43 CFR 3400.0-5).

§ 3427.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement section 714 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1304).

§ 3427.1 Deposits subject to consent.

On split estate lands (43 CFR 3400.0-5) where the surface is owned by a qualified surface owner, coal deposits that will be mined by methods other than underground mining techniques shall not be included in a lease sale notice without written consent from the qualified surface owner (43 CFR 3400.0-5) allowing the lessee/operator to enter and commence surface mining operations.

§ 3427.2 Procedures.

(a) Each written consent, evidence of written consent, or statement of refusal to consent shall be filed with the appropriate Bureau of Land Management State Office (43 CFR Subpart 1821) at least 30 working days prior to the publication of the lease sale notice of the lands to which it applies. It shall be the responsibility of parties intending to file consents to be aware of pending coal lease sale notice dates. Generally, these dates shall be as published in the final regional sale schedule (43 CFR 3420.7).

(b) Written consent or evidence of written consent may be filed by any private person or persons with an interest in the lease sale of split estate lands. A statement of refusal to consent shall be filed by the qualified surface owner.

(c) The filing shall, at a minimum contain the present legal address of the qualified owner, and, if it is a written consent or evidence thereof, a copy of the written consent or evidence thereof, and the name, ownership, interest, if any, and legal address of the party who acquired the consent.

(d) At each stage in the tract delineation, ranking and scheduling in that region, areas covered by written consents that are filed with the appropriate State Office before the final decision on the pending regional lease sale schedule shall be given priority over other split estate areas where there is a qualified surface owner.

(e) Within fifteen working days after the filing of a written consent, evidence thereof, or a statement of refusal to consent, the State Office shall verify that the written consent or evidence of such consent meets all of the following requirements, and that the statement of refusal to consent meets the requirements of paragraphs (2) and (3):

(1) The right to enter and commence mining is transferable to whomever makes the successful bid in a lease sale for a tract which includes the lands to which the consent applies. A written consent shall be considered transferable only if, at a minimum, it provides that after the lease sale for the tract to which the consent applies (i) the payment for the consent is to be made by the successful bidder or (ii) the successful bidder is permitted to reimburse the company which first obtained the consent for the purchase price of the consent.

(2) The named surface owner is a qualified surface owner as defined in § 3400.0-5 of this title and resides at the address specified in the filing.

(3) The title for all lands described in the filing is held by the named qualified surface owners.

(f) Upon receipt of a filing from anyone other than the named qualified surface owner, the authorized officer shall contact the named qualified surface owner and request his confirmation in writing that the filed, transferable, written consent to enter and commence mining has been granted and that the filing fully discloses all of the terms of the written consent.

(g) The conditions of (e) and (f) shall be met prior to publication of the sale notice.

(h) The State Director shall in all cases notify the person or persons filing the written consent, evidence of written consent, or statement of refusal to consent of the results of the review of the filing, including any request for additional information needed to satisfy the requirements of this subpart in cases where insufficient information was supplied with the original filing.

(i) The terms and purchase price of any applicable written surface owner consent shall be included with the description of the tract(s) in the notice of lease sale.

(j) Any statement of refusal to consent shall be treated as controlling until the land use plan that includes the area covered by the refusal to consent is revised, or the surface estate is sold. When revision of the land use plan is initiated, the qualified surface owner shall be notified that his prior statement of refusal has expired, and given the opportunity to submit another statement.

§ 3427.3 Validation of information.

Any person submitting a written consent shall include with his filing a statement that the evidence submitted, to the best of his knowledge, represents a true, accurate, and complete statement of information regarding the consent for the area described.

§ 3427.4 Refusal of consent.

Any person having knowledge of qualified surface owners who have refused outright grant written consent is asked to notify the proper Bureau of Land Management State Office. (43 CFR Subpart 1821). Should the authorized officer decide on the basis of this information, any statement of refusal, or qualified surface owner preferences expressed during land use planning, that written consent cannot be obtained for the foreseeable future, coal deposits that underlie land owned by such qualified surface owners shall be eliminated from the regional sale scheduling process.

§ 3427.5 Pre-existing consents.

An otherwise valid written consent given by a qualified surface owner prior to August 4, 1977, shall be considered valid for the purposes of this subpart. Where the authorized officer determines that any such written consent is not transferable to any potential bidder on the tract in which the area covered by the consent is included, that tract shall be offered for sale only in a sale using intertract bidding

competition as defined in §3400.0-5 of this title.

PART 3430—NONCOMPETITIVE LEASES

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Subpart 3430—Preference Right Leases

§ 3430.0-1 Purpose.

These regulations set forth procedures for processing noncompetitive (preference right) coal lease applications on Federal lands.

§ 3430.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement section 2(b) of the Mineral Leasing Act of 1920 (30 U.S.C. 201(b)).

§ 3430.0-7 Scope.

Because section 4 of the Federal Coal Leasing Amendments Act of 1976, amending 30 U.S.C. 201(b), repealed the Secretary's authority to issue or extend a coal prospecting permit on Federal lands, the regulations in this subpart apply only to lease applications which have already been filed. No additional prospecting permits that confer a preference right to a coal lease shall be issued. Therefore, these regulations address only the procedures for processing pending preference right lease applications. The surface owner consent provisions of the Surface Mining Control and Reclamation Act of 1977 do not apply to preference right lease applications.

§ 3430.1 Preference right leases.

§ 3430.1-1 Showing required for entitlement to a lease.

An applicant for a preference right lease shall be entitled to a noncompetitive coal lease if the applicant can demonstrate that he discovered commercial quantities of coal on the permit lands within the term of the permit, all other requirements having been met.

§ 3430.1-2 Commercial quantities defined.

For the purpose of § 3430.1-1 of this title, commercial quantities is defined as follows:

(a) The coal deposit discovered under the permit shall be of such character and quantity that a prudent person would be justified in further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine.

(b) The applicant shall present sufficient evidence to show that there is a reasonable expectation that revenues from the sale of the coal shall exceed the cost of developing the mine and extracting, removing, transporting, and marketing the coal. The costs of development shall include the estimated cost of exercising environmental protection measures and suitably reclaiming the lands and complying with all applicable Federal and state laws and regulations.

§ 3430.2 Application for lease.

§ 3430.2-1 Initial showing.

All preference right coal lease applications shall have contained or shall have been supplemented by the timely submission of the following information:

(a) The measured and indicated quantity and quality of the reserves discovered within the boundaries of the permit.

(1) Coal quantity shall be indicated by structural maps of the tops of all beds to be mined, isopachous maps of beds to be mined and interburden; and, for beds to be mined by surface mining methods, isopachous maps of the overburden. These maps shall show the location of test holes and outcrops. An estimate of the measured and indicated reserves for each bed to be mined shall be included.

(2) Coal quality data shall include, at a minimum, an average proximate analysis, sulfur content, and BTU content of the coal in each seam to be mined. Also, all supporting geological and geophysical data used to develop the required information shall be submitted.

(b) Topographic maps as available from State or Federal sources showing physical features, drainage patterns, roads and vehicle trails, utility systems, and water sources. The location of proposed development and mining operations facilities shall be identified on the maps. These maps shall include the approximate locations and extent of tailings and overburden storage areas; location and size of pit areas; and the location of water sources or other resources that may be used in the proposed operation and facilities incidental to that use.

(c) A narrative statement that includes:

(1) The anticipated scope of operations, the schedule of operations, and the types of equipment to be used;

(2) The mining method to be used and an estimate of the expected mining sequence and production rate;

(3) The relationship, if any, between operations planned on the land applied for and existing or planned operations and facilities on adjacent lands;

(4) A brief description, including maps or aerial photographs as appropriate of: (i) existing land uses on and adjacent to the applied for land; (ii) known geologic, visual, cultural, or ar-

chaeological features on the applied-for land: and (iii) known wildlife habitat, and that of threatened or endangered plant and animal species, that may be affected by the planned exploration and mining operations;

(5) A brief description of measures planned to prevent or control fire and to mitigate or prevent soil erosion, ground and surface water pollution, damage to wildlife or its habitat, air and noise pollution, hazards to public health and safety, and impacts to the social and infrastructure systems of local communities; and

(6) A brief description of any plans that the applicant wishes to have considered by the authorized officer which show how the applicant expects to reclaim disturbed sites and otherwise meet applicable laws and regulations.

§ 3430.2-2 Additional information.

In addition to the information required by § 3430.2-1 of this title, the applicant shall have submitted certified abstracts indicating the presence of any mining claims lying within or partly within the preference right lease application area that were located prior to the issuance of the prospecting permit.

§ 3430.3 Planning and environment.

§ 3430.3-1 Land use planning.

A preference right lease may not be issued until the lands involved have been included in an acceptable land use plan that complies with the current applicable planning regulations in effect for the land management agency, or a land use analysis, under § 3420.1-5 of this title.

§ 3430.3-2 Environmental assessment.

(a) After the applicant has completed the initial showing required under § 3430.2 of this title, the authorized officer shall conduct an environmental assessment of the proposed preference right lease area and prepare an environmental assessment record.

(b) The environmental assessment shall include:

(1) An evaluation of direct and indirect potential impacts including cumulative impacts of leasing and development upon the physical and socioeconomic environment of the proposed lease area and adjacent areas that may be affected;

(2) An evaluation of the technical and natural potential for successful reclamation on the proposed lease area; and

(3) An evaluation of all reasonable alternatives to leasing the area or to any known plans of operation for the proposed area as set forth in any preliminary data and information.

(c) The environmental assessment record shall be prepared containing recommendations on lease terms and special stipulations regarding:

(1) Lands that should be excluded from the proposed lease area to avoid unacceptable environmental or social impacts, including those lands to be excluded as identified through the application of the unsuitability criteria of subpart 3461 of this title;

(2) Any specific measures required to avoid or to mitigate adverse impacts, or to reclaim areas that may be acceptable for leasing and development, including measures to assure appropriate post-mining land use and measures to prevent irreparable damage to or destruction of unique environmental values that are identified through the application of the unsuitability criteria of subpart 3461 of this title.

(d) If, based upon the environmental assessment record prepared under (c), the authorized officer determines that an environmental statement, is required under the National Environmental Policy Act of 1969, such a statement shall be prepared according to 40 CFR 1500.

(e) If, based upon the environmental assessment record prepared under (c), the authorized officer determines that an environmental statement is not required, a finding of no significant impact shall be prepared and issued in accordance with 40 CFR 1501.4 and 1506.6

§ 3430.4 Final showing.

§ 3430.4-1 Request for final showing.

(a) Upon completion of the environmental assessment, the authorized officer shall promptly request a final showing by the applicant.

(b) The authorized officer shall transmit to the applicant, with the request for a final showing, the following:

(1) The proposed lease form, including any proposed stipulations; and

(2) A copy of the environment assessment, including a map or maps showing all areas subject to specific stipulations because they have been assessed or designated to be unsuitable for coal mining operations or otherwise.

(c) Within 90 days of receiving the proposed lease form, the applicant shall submit the following information:

(1) Estimated revenues;

(2) The estimated costs that a prudent person would consider before deciding to operate the proposed mine, including but not limited to, the cost of developing the mine, removing the coal, processing the coal to make it salable, transporting the coal, paying applicable royalties and taxes, and complying with applicable laws and regulations, the proposed lease terms, and special stipulations; and

(3) A comparison of the estimated costs and revenues and of mining venture constituting the logical mining unit of which the lease would become a part.

(d) The information submitted by the applicant shall be sufficiently detailed to determined whether the applicant's showing (1) has a reasonable factual basis, (2) supports the applicant's assertion that the proposed lease contains commercial quantities of coal, and (3) reflects a consideration of all factors required by this section.

(e) The applicant may delete any area subject to special stipulations, because it has been assessed to be unsuitable or otherwise, and the costs of mining subject to the stipulations, from the final showing required by paragraph (c) of this section.

§ 3430.4-2 Additional information.

(a) If the applicant for a preference right lease has not submitted all information required in § 3430.4-1 of this title, the authorized officer shall request additional information and shall specify the information required.

(b) The applicant shall submit any requested additional information within 60 days of the receipt of the request. The authorized officer may grant one 60-day extension if the applicant files a written request within the first 60-day period.

§ 3430.5 Determination of entitlement to lease.

§ 3430.5-1 Reflection of application.

The authorized officer shall reject the application if:

(a) The final showing of the applicant fails to show that coal exists in commercial quantities on the applied for lands; or

(b) The applicant does not respond to a request for additional information within the time period specified in § 3430.4-2 of this title.

§ 3430.5-2 Appeals, lack of showing.

(a) If the application is rejected because the existence of commercial quantities of coal has not been shown, the applicant may, in accordance with the procedures in Part 4 of this title, file a notice of appeal and a statement of the reasons for the appeal.

(b) The applicant shall have the right to a hearing before an Administrative Law Judge if the applicant alleges that the facts in the application are sufficient to show entitlement to a lease.

(c) In such a hearing, the applicant shall bear both the burden of going forward and the burden of proof to show, by a preponderance of evidence,

that commercial quantities of coal exist in the proposed lease area.

§ 3430.5–3 Determination to lease or seek an exchange.

(a) A preference right lease shall be issued if, upon review of the application, the land use plan or analysis, and environmental assessment record, the authorized officer determines:

(1) The coal has been discovered in commercial quantities on the lands applied for; and

(2) That the applicant has used reasonable economic assumptions and data to support the showing that coal has been found on the proposed lease in commerical quantities; and

(3) That the protective lease stipulations assure that environmental damage can be avoided or acceptably mitigated and that the mined land can be reclaimed in accordance with applicable laws and regulations.

(b) If the authorized officer determines that:

(1) The land under application has been shown to contain commercial quantities of coal;

(2) All or a portion of the proposed lease has been assessed as land that should be unavailable for coal development because of land use or resource conflicts or as land that is unsuitable for coal mining operations under the provisions of subpart 3461 of this title; and

(3) The land is exempted from the application of any relevant unsuitability criteria or, for similar reasons, the Secretary lacks the authority to prevent damage to or loss of the land use of resource values threatened by lease operations—he may recommend that the Secretary initiate exchange proceedings under § 3530.5–4 of this title.

§ 3430.5–4 Lease exchange.

The Secretary may initiate, upon his own initiative, the recommendation of the authorized officer, or the request of the applicant, lease exchange procedures under 43 CFR Subpart 3435 for the issuance of coal lease bidding rights, modifications to existing coal leases, a mineral lease under subpart 3526 of this title, or in the case of an application including lands in an alluvial valley floor, the issuance of a coal lease under provisions of subpart 3436 of this title, if he finds that the three conditions in § 3430.5–3(b) of this title are met.

§ 3430.6 Lease issuance.

§ 3430.6–1 Lease terms.

Each preference right lease shall be subject to requirements for Federal coal leases established in subpart 3475 of this title including: diligent development and continued operation, royalty and rental rates, and logical mining unit requirements as provided in § 3475.4 of this title.

§ 3430.6–2 Bonding.

The compliance bond for a preference right lease shall be set in accordance with subpart 3474 of this title.

§ 3430.6–3 Lease area.

A preference right lease shall include all lands in the application used in determining the entitlement to a lease.

§ 3430.6–4 Duration of leases.

Preference right leases shall be issued for a term of 20 years and for so long thereafter as coal is produced in commercial quantities as defined in subpart 3400.0–5 of this title. Each lease shall be subject to readjustment at the end of the first 20-year period and at the end of each period of 10 years thereafter.

§ 3430.7 Trespass.

Mining operations conducted prior to the effective date of a lease shall constitute an act of trespass and be subject to penalties specified by § 9239.5 of this title.

Subpart 3431—Negotiated Sales—Rights-of-Way.

§ 3431.0–1 Purpose.

The purpose of this subpart is to provide procedures for the sale of coal that is necessarily removed in the exercise of a right-of-way issued under Title V of the Federal Land Policy and Managemenet Act of 1976 (43 U.S.C. 1761 *et seq.*).

§ 3431.0–3 Authority.

(a) The regulations of this subpart are issued under the authority of the statutes cited in § 3400.0–3 of this title.

(b) These regulations primarily implement section 2(a)(1) of the Mineral Leasing Act of 1920, as amended by section 2 of the Act of October 30, 1978 (30 U.S.C. 201 (a)(1)).

§ 3431.1 Qualified purchaser.

Any person who has acquired a right-of-way under Title V of the Federal Land Policy and Management Act of 1976 and is required to remove Federal coal in order to develop, construct or use the right-of-way is qualified to purchase the coal to be removed.

§ 3431.2 Terms and conditions of sale.

(a) Coal to be removed in connection with a right-of-way shall be sold to the qualified purchaser only at the estimated fair market value, as determined by the Secretary.

(b) Where the right-of-way is being used in connection with the development of a lease, the removal of coal from the right-of-way shall be subject to the same requirements for health and safety protection, surface protection and rehabilitation, and maximum economic recovery that apply to the lease involved.

(c) Where the right-of-way is not being used in connection with the development of a Federal coal lease, the removal of the coal shall be made subject to the Surface Mining Control and Reclamation Act of 1977, and subject to such terms and conditions as the authorized officer determines are necessary: (1) to protect public health, safety, and the environment; and (2) to ensure the same recovery of the resource in the right-of-way that is required under a lease under the provisions of group 3400 of this title.

(d) All terms and conditions of the sale shall be terms and conditions of the right-of-way and shall be administered under the provisions of group 2800 of this title.

Subpart 3432—Lease Modifications

§ 3432.1 Application.

(a) A lessee may apply for a modification of a lease to include coal lands or coal deposits contiguous to those embraced in a lease. In no event shall the acreage in the application, when combined with the total area added by all modifications made after August 4, 1976, exceed 160 acres or the number of acres in the original lease, whichever is less.

(b) The lessee shall file the application for modification in the Bureau of Land Management State Office having jurisdiction over the lands involved (43 CFR Subpart 1821), describing the additional lands desired, the lessee's needs or reasons for such modification, and the reasons why the modification would be to the advantage to the United States.

§ 3432.2 Availability.

(a) The authorized officer may modify the lease to include the lands applied for if he determines that: (1) the modification serves the interests of the United States; (2) there is no competitive interest in the lands or deposits; and (3) the additional lands or deposits cannot be developed as part of another potential or existing independent operation.

(b) Coal deposits underlying land the surface of which is held by a qualified surface owner, and which would be mined by other than underground mining techniques, may not be added to a lease by modification.

(c) The lands applied for shall be added to the existing lease without competitive bidding, but the United States shall receive the fair market value of the lease of the added lands, either by cash payment or adjustment of the royalty applicable to the lands.

§ 3432.3 Terms and conditions.

(a) The terms and conditions of the original lease shall be consistent with the laws, regulations, and lease terms applicable at the time of modification except that if the original lease was issued prior to August 4, 1976, the minimum royalty provisions of the Federal Coal Leasing Amendments Act of 1976 (90 Stat. 1083) shall not apply to any lands covered by the lease prior to its modification until the lease is readjusted.

(b) Before a lease is modified, the lessee shall file a written acceptance of the conditions imposed in the modified lease and a written consent of the surety under the bond covering the original lease to the modification of the lease and to extension of the bond to cover the additional land. Such modifications must meet the same environmental safeguards as set out for emergency leases in § 3425.5 of this title.

Subpart 3435—Lease Exchange

§ 3435.0-1 Purpose.

The objective of these regulations is to provide methods for exchange of coal resources when it would be in the public interest to shift the impact of mineral operations from leased lands to currently unleased lands to preserve public resource or social values, and to carry out Congressional directives authorizing coal lease exchanges.

§ 3435.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement:

(1) Section 3 of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 203);

(2) Section 522 of the Surface Mining Control and Reclamation Act (30 U.S.C. 1272); and

(3) Section 1 of the Act of October 30, 1978 (92 Stat. 2073).

§ 3435.1 Coal lease exchanges.

Where the Secretary determines that coal exploration, development and mining operations would not be in the public interest on an existing lease or preference right lease application, or where the Congress has authorized lease exchange for a class or list of leases, an existing lease or preference right lease application may be relinquished in exchange for:

(a) Cases where the Congress has specifically authorized, the issuance of a new coal lease.

(b) The issuance of coal lease bidding rights of equal value;

(c) A mineral lease other than coal, by mutual agreement between the applicant and the Secretary under subpart 3526 of this title; or

(d) Federal coal lease modifications; or

(e) Any combination of the above.

These interests may be granted to the extent of the Secretary's authority in exchange for the relinquishment of all or part of the existing lease or preference right lease application area, any part of which has been or may be assessed to be unacceptable for development because of non-coal public values identifed or discovered after the lease or permit was issued.

§ 3435.2 Qualified exchange proponents—Limitations.

(a) Any person who holds a Federal coal lease, or a preference right lease application that has been found to meet the commercial quantities requirements fo §§ 3430.1 and 3430.5 of this title on lands described in § 3435.1 of this title is qualified to ask the Secretary to initiate an exchange.

(b) Except for leases qualified under subpart 3536 of this title, the Secretary may issue a new coal lease in exchange for the relinquishment of outstanding leases or lease applications only in those cases listed in section 1 of the Act of October 30, 1978.

(c) The Secretary shall evaluate each qualified exchange request and determine whether an exchange is appropriate.

§ 3435.3 Exchange procedures.

§ 3435.3-1 Exchange notice.

(a) The Secretary shall initiate exchange procedures by notifying in writing a Federal coal lessee or preference right lease applicant that consideration of an exchange of mineral leases or other coal lease interests is appropriate. The notification may be on the Secretary's initiative or in response to a request under § 3435.2 of this title.

(b) The exchange notice shall include a statement of why the Secretary believes an exchange may be in the public interest.

(c) The notice may contain a description of the lands on which the Secretary would grant lease interest in exchange. If the exchange is for coal development rights, the lands shall be selected from those found acceptable for further consideration for leasing under § 3420.2 of this title. The description of the interests under consideration for relinquishment may include all or part of an existing lease or preference right lease application.

(d) The notice shall contain a request that the lessee or preference right lease applicant indicate whether he is willing to negotiate an exchange.

§ 3435.3-2 Initial response by lessee or lease applicant.

(a) The lessee or preference right lease applicant wishing to negotiate an exchange shall so reply in writing within 60 days of the receipt of the exchange notice. The reply may include a description of the lands on which the lessee or lease applicant would accept an exchange lease or grant of coal lease modifications and, if appropriate, a showing of written consent from a qualified surface owner.

(b) A reply to the exchange notice by a lessee or preference right lease applicant indicating willingness to enter into an exchange shall also indicate willingness to provide the geologic and economic data needed by the Secretary to determine the fair market value of the lease or lease application to be relinquished. The lessee or preference right lease applicant shall also indicate willingess to provide any geologic and economic data in his possession that will help the Secretary to determine the fair market value of the potential Federal lease exchange tract or tracts.

§ 3435.3-3 Agreement to terms.

(a) If both parties wish to proceed with the exchange, the authorized officer and the lessee or preference right lease applicant shall:

(1) Negotiate the selection of appropriate exchange lands containing a logical mining unit of coal in those cases where the Secretary is authorized to issue a coal exchange lease, or a minable unit of leasable minerals other than coal;

(2) Negotiate appropriate coal lease modifications;

(3) Negotiate to establish the value of coal lease bidding rights; or

(4) Negotiate any combination of the above.

(b) Any land leased in exchange shall, to the satisfaction of the lessee or lease applicant and the Secretary, be a lease tract containing coal or deposits of other leasable minerals equal to the fair market value of the relinquished deposits.

(c) Land proposed for lease in exchange for, or for inclusion in, an existing lease or preference right lease application shall be subject to leasing under subpart 3420 or group 3400 or 3500 of this title as appropriate.

§ 3435.3-4 Determination of value.

The value of the land to be leased, or added by lease modification, or of the bidding rights to be issued in exchange shall, to the satisfaction of the applicant and the Secretary, be equal to the estimated fair market value of the lease or lease application to be relinquished.

§ 3435.3-5 Notice and public hearing.

After the lessee or lease applicant and the Secretary agree on the land to be leased, the coal lease modifications to be granted or the bidding rights to be issued, notice of the proposed exchange shall be published in the FEDERAL REGISTER and in at least one newspaper of general circulation in each county or equivalent political subdivision where both the offered and selected lands are located. The notice shall announce that, upon request, at least one public hearing will be held in a city or cities located near each tract involved. The notice shall also contain the Secretary's preliminary findings why the proposed exchange is in the public interest. The hearing(s), if any, shall be held to obtain public comments on the merits of the proposed exchange.

§ 3435.3-6 Consultation with Governor.

(a) The Secretary will notify the Governor of each State in which lands in the proposed exchange are located of the terms of the exchange and the Secretary's preliminary findings why the exchange is in the public interest. The Secretary shall give each Governor at least 45 days after this notification to comment on the proposal prior to consummating the exchange.

(b) If, within the 45 day period, the Governor(s), in writing, objects to an exchange that involves leases or lease rights in more than one State, the Secretary will not consummate the exchange for 6 months from the date of objection. The Governor(s) may during this 6-month period submit a written statement why the exchange should not be consummated, and the Secretary shall, on the basis of this statement, reconsider the lease proposal.

§ 3435.4 Issuance of lease, lease modification, or bidding rights.

(a) If, after any public hearing(s), the Secretary by written decision concludes that the issuance of a coal or other mineral lease or coal lease modification or coal lease bidding rights in exchange for the relinquishment of the existing lease, preference right lease application or portion thereof is in the public interest, lease stipulations for operations on the exchange lease or modified lease shall be established.

(b) The exchange lease shall contain:

(1) A statement that the lessee thereby quitclaims any right or interest in the lease or preference right lease application exchanged; and

(2) A statement of the Secretary's findings that lease issuance is in the public interest.

(c) The exchange lease or lease modification shall be issued upon relinquishment of the lease, preference right lease application, or portion thereof.

(d) The exchange lease or lease modification shall be subject to all relevant provisions of group 3400 or 3500 of this chapter, 30 CFR Chapter VII, Subchapter D, and 30 CFR Part 211, as appropriate.

Subpart 3436—Lease Exchange—Alluvial Valley Floors

§ 3436.0-1 Purpose.

The purpose of this subpart is to establish procedures for coal lease exchanges where coal development operations would interrupt, discontinue or preclude farming on alluvial valley floors west of the 100th Meridian, west longitude.

§ 3436.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement section 510(b)(5) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1260(b)(5)).

§ 3436.1 Qualified exchange proponents.

(a) The coal lease exchange program for alluvial valley designations shall be limited to any person who holds a Federal coal lease or preference right lease application on lands west of the 100th Meridian, west longitude, and who has made substantial financial and legal commitments, as defined in § 3400.0-5 of this title prior to January 4, 1977, in connection with the lease or preference right lease application, and who otherwise meets the criteria in the proviso in section 510(b)(5) of the Surface Mining Control and Reclamation Act of 1977. Any such person may propose an exchange under this subpart.

(b) The lease offered in exchange by the Secretary shall be for lands determined to be acceptable for leasing under criteria of the Bureau of Land Management and Geological Survey, including the unsuitability criteria in subpart 3461 of this title.

§ 3436.2 Exchange procedures.

(a) Any qualified lessee may propose the exchange to the Secretary through the Bureau of Land Management State Office having jurisdiction over the leased land (43 CFR Subpart 1821). No special form of application is required.

(b) The exchange shall processed in accordance with the procedures in subpart 3435 of this title for other lease and lease interest exchanges.

§ 3436.3 Recovery of costs.

The exchange proponent shall bear all administrative costs of the exchange, including the cost of establishing the value of each lease involved in the exchange.

§ 3436.4 Lease issuance.

Any coal lease issued as a result of an exchange under this subpart shall be subject to all relevant provisions of group 3400 of this title, 30 CFR Chapter VII, Subchapter D, and 30 CFR Part 211.

Subpart 3437—Coal Exchange—Alluvial Valley Floors

§ 3437.0-1 Purpose.

The purpose of this subpart is to establish criteria for the exchange of privately owned (fee) coal for unleased federally-owned coal where coal mining operations would interrupt, discontinue, or preclude farming on alluvial valley floors west of the 100th Meridian, west longitude.

§ 3437.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement:

(1) Section 510(b)(5) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1260(b)(5)); and

(2) Section 206 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1716).

§ 3437.1 Qualification criteria.

§ 3437.1-1 Qualified exchange proponents.

The fee coal exchange program for alluvial valley designations shall initially be limited to all qualified persons who own coal west of the 100th Meridian, west longitude, and:

(a) Who have made substantial financial and legal commitments, as defined in § 3400.0-5 of this title prior to January 4, 1977, in connection with the coal holding; or

(b) Who have had a surface mining permit rejected by the state regulatory authority because the holding is in an alluvial valley floor, and who otherwise meet the criteria of the provision in section 510(b)(5). Any such person may propose and exchange under this subparat.

§ 3437.1-2 Unqualified proponents.

The Secretary shall not consider an exchange proposed by the owner of coal west of the 100th Merdian, west longitude, where:

(a) The premining land use is undeveloped rangeland which is not significant to farming;

(b) The area of affected alluvial valley floor is small and provides or may provide only negligible support for production from one or more farms; or

(c) The prohibition against mining the coal in the alluvial valley floor does not substanially decrease the value of, or prevent the successful mining of, other coal that would have been developed in conjunction with the coal in the alluvial valley floor.

§ 3437.2 Exchange procedures.

(a) The Secretary shall evaluate each qualified exchanged request and determine whether the exchange proponent is qualified and whether a request is appropriate and is in the public interest.

(b) Qualified requests shall be processed in accordance with the regulations of subpart 2200 of this title subject to the provisions of this subpart.

(c) The coal deposits offered in exchange by the Secretary shall be assessed as acceptable for mining operations under the criteria of the Bureau of Land Management, and the Geological Survey, including the unsuitability criteria in subpart 3461 of this title.

(d) Exchange under this subpart, whether proposed by the Secretary or by a qualified exchange proponent, may include the coal estate, the entire mineral estate, or the entire mineral and surface estates in the lands conveyed to the United States or in the lands conveyed by the United States.

PART 3440—LICENSES TO MINE

Subpart 3440—Licenses to Mine

Sec.
3440.0-1 Purpose.
3440.0-3 Authority
3440.1 Terms.
3440.1-1 Forms.
3440.10-2 Limitations on coal use.
3440.1-3 Area and duration of license.
3440.1-4 Production reports.

AUTHORITY: 30 U.S.C. 181 et seq.

Subpart 3440—Licenses to Mine

§ 3440.0-1 Purpose.

A license to mine may be issued without the payment of any rent or royalty for a period of 2 years to an individual or association of individuals to mine and take coal for local domestic need for fuel.

§ 3440.0-3 Authority.

(a) These regulations are issued under the authority of the statutes cited in § 3400.0-3 of this title.

(b) These regulations primarily implement section 8 of the Act of February 25, 1920, as amended (30 U.S.C. 208).

§ 3440.1 Terms.

§ 3440.1-1 Forms.

(a) Four copies of the application for a license to mine coal for domestic needs or for a renewal of such a license shall be filed on a form approved by the Director, or a substantial equivalent of the form, in the Bureau of Land Management State Office having jurisdiction over the lands involved (43 CFR Subpart 1821). The original application or any renewal application shall be accompanied by the fee prescribed in section 3473 of this title, except when the application is filed by a relief agency.

(b) A municipality shall file the information required under § 3472.2-5(b) of this title.

§ 3440.1-2 Limitations on coal use.

License may be issued to municipalities for the nonprofit mining and disposal of coal to their residents for household use only. Under such a license, a municipality may not mine coal either for its own use or for nonhousehold use such as for factories, stores, other business etablishments and heating and lighting plants.

§ 3440.1-3 Area and duration of license.

(a) A license to mine for an individual or association in the absence of unusual conditions or necessity, shall be limited to a legal subdivision of 40 acres or less and may be revoked at any time. Each license to mine shall terminate at the end of 2 years from the date of issuance, unless an application for a 2 year renewal is filed and approved before its termination date.

(b)(1) The authorized officer may authorize a recognized and established relief agency of any State, upon the agency's request, to take government-owned coal deposits within the State and provide the coal to localities where it is needed to supply families on the rolls of such agency who require coal for household use but are unable to pay for that coal.

(2) Tracts shall be selected in areas assessed as acceptable for mining operations and at points convenient to supply the families in a locality. Each family shall be restricted to the amount of coal actually needed for its use, not to exceed 20 tons annually.

(3) Coal shall be taken from such tracts only by those with written authority from the relief agency. All mining shall be done pursuant to such authorization. All Federal and State laws and regulations for the safety of miners, prevention of fires and of waste, etc., shall be observed. The relief agency shall see that the premises are left in a safe condition for future mining operations.

(c) A license to mine to a municipality may not exceed 320 acres for a municipality of less than 100,000 population, 1,280 acres for a municipality between 100,000 and 150,000 population, and 2,560 acres for a municipality of 150,000 population or more. A license to mine to a municipality shall terminate at the end of 4 years from date of issuance, unless an application for a 4 year renewal is filed and approved before its termination date.

§ 3440.1-4 Production reports.

Each holder of a license to mine shall provide an annual report to the appropriate Bureau of Land Management State Office describing all operation conducted under such license.

PART 3450—MANAGEMENT OF EXISTING LEASES

Subpart 3451—Continuation of Leases—Readjustment of Terms

Sec.
3451.1 Readjustment of lease terms.
3451.2 Notification of readjusted lease terms.

Subpart 3452—Relinquishment, Cancellation, and Termination

3452.1 Relinquishment.
3452.1-1 General.
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3452.1-3 Acceptance.
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Subpart 3453—Transfers by Assignment, Sublease or Otherwise

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3453.1-2 Number of copies required.
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3453.3 Approval.
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3453.3-2 Disapproval of transfers.
3453.3-3 Effective date.
3453.3-4 Extensions.

AUTHORITY: 30 U.S.C. 181 et seq; 30 U.S.C. 351-359; 30 U.S.C. 521-531; 30 U.S.C. 1201 et seq; 42 U.S.C. 7101 et seq; and 43 U.S.C. 1701 et seq.

Subpart 3451—Continuation of Leases—Readjustment of Terms

§ 3451.1 Readjustment of lease terms.

(a) All leases issued prior to August 4, 1976, shall be subject to readjustment at the end of the current 20-year period and at the end of each 10-year period thereafter. All leases issued after August 4, 1976, shall be subject to readjustment at the end of the first 20-year period and each 10-year period thereafter, if the lease is extended.

(b) The authorized officer shall notify the lessee whether or not any readjustment of terms and conditions is to be made. If feasible, the authorized officer shall so notify the lessee of any lease which becomes subject to re-

adjustment prior to January 1, 1980, before the expiration of the initial 20-year period, or any succeeding 10-year period.

(c) If the lease became subject to readjustment of terms and conditions before August 4, 1976, but the authorized officer prior to that date neither readjusted the terms and conditions nor informed the lessee wheter or not a readjustment would be made, the terms and conditions of that lease shall be readjusted to conform to the requirements of the Federal Coal Leasing Amendments Act of 1976.

(d) The authorized officer shall notify the lessee of any lease which becomes subject to readjustment after January 1, 1980, whether any readjustment of terms and conditions will be made prior to the expiration of the initial 20-year period or any succeeding 10-year period thereafter. On such a lease the failure to so notify the lessee shall mean that the United States is waiving its right to readjust the lease for the readjustment period in question.

(e) In the notification that the lease will be readjusted, the athorized officer shall require the lessee to furnish information specified in § 3422.3-4 of this title for review by the Attorney General as required by section 27(1) of the Mineral Leasing Act of 1920, as amended. The lease shall be subject to cancellation if the lessee fails to furnish the required information within the time allowed. No lease readjustment shall be effective until 30 days after the authorized officer has transmitted the required information to the Attorney General.

§ 3451.2 Notification of readjusted lease terms.

(a) If the notification that the lease will be readjusted did not contain the proposed readjusted lease terms, the authorized officer shall, as soon as feasible, notify the lessee of the proposed readjusted lease terms.

(b) The notification of readjusted lease terms shall also notify the lessee that if he does not file either an objection to the proposed readjustement or a relinquishment of the lease within 60 days after receipt of notice of the proposed readjusted terms from the authorized officer, the terms of such readjustment shall be considered agreed upon.

(c) The notification of readjusted lease terms shall specify the procedures to be followed if the lessee objects to the proposed readjusted lease terms.

(d) The readjusted lease terms shall become effective either 60 days after the lessee is notified what they are, or 30 days after the authorized officer transmits the required information to the Attorney General, whichever is later.

Subpart 3452—Relinquishement, Cancellation and Termination

§ 3452.1 Relinquishment.

§ 3452.1-1 General.

Upon a satisfactory showing that the public interest shall not be impaired, the lessee may surrender the entire lease, a legal subdivision thereof, an aliquot part thereof (not less than 10 acres), or any seam or bed of the coal deposits therein. A partial relinquishement shall describe clearly the surrendered parcel or coal depostis and give the exact acreage relinquished.

§ 3452.1-2 Where filed.

A relinquishement shall be filed in triplicate by the lessee in the Bureau of Land Management State Office having jurisdiction over the lands involved (43 CFR Subpart 1821).

§ 3452.1-3 Acceptance.

The relinquishment shall be effective on the date that the authorized officer determines that all accured rentals and royalties have been paid and that all the obligations of the lessee under the regulations and terms of the lease have been met.

§ 3452.2 Cancellation.

§ 3452.2-1 Cause for cancellation.

(a) The authorized office, after compliance with § 3452.2-2 of this title, may take the appropriate steps to institute proceedings in a court of competent jurisdiction for the cancellation of the lease if the lessee: (1) fails to comply with the provisions of the Mineral Leasing Act of 1920, as amended; (2) fails to comply with the general regulations in force at the date of the lease or in force at the effective date of any readjustment of the terms and conditions of the lease, or with regulations issued after lease issuance and readjustment but made applicable under the terms of the lease; or (3) defaults in the performance of any of the terms, covenants, and stipulations of the lease.

(b) A waiver of any particular breach or cause of forfeiture shall not prevent the cancellation and forfeiture of the lease for any other breach or cause of forfeiture, or for the same cause occurring at any other time.

(c) Any lease issued or readjusted before August 4, 1976, on which the lessee does not meet either the diligent development requirements or the continued operation requirements shall be subject to cancellation in whole or in part. In deciding whether to initiate lease cancellation proceedings under this subsection, the Secretary shall not consider adverse circumstances which arise out of (1) normally foreseeable costs of compliance with requirements for environmental protection; (2) commonly experienced delays in delivery of supplies or equipment; or (3) inability to obtain sufficient sales.

§ 3452.2-2 Cancellation procedure.

The lessee shall be given notice of any proposed cancellation and be afforded 30 days to correct the default, to request an extension of time in which to correct the default, or to submit evidence showing why the lease should not be cancelled.

§ 3452.3 Termination.

(a) Any lease issued or readjusted on or after August 4, 1976, shall be terminated if the lessee does not meet the diligent development requirements.

(b) Existing leases that are not included within an approved mine plan shall be subject to assessment of all or part of the lands contained in the lease as unsuitable for coal mining operations as set out in § 3461.1(c) of this title. This assessment shall be made either after an operator submits a mining plan, at the initiation by the lessee of a request for exchange, or during land use planning. If a lease area or portion of a lease area is assessed to be unsuitable for coal mining operations or the lease is found to be incompatible with the land use plan, the Secretary may enter into negotiations with the lessee for exchange of coal lease bidding rights or other mineral leases or coal lease modifications as described in subpart 3435 of this title. If a lease area or portion of a lease area is assessed to be unsuitable because of impacts to alluvial valley floors, the Secretary may enter into negotiations with the lessee to exchange the lease for another Federal coal lease in an area acceptable for mining operations pursuant to subpart 3436 of this title.

(c) Should a lease be cancelled or terminated for any reason, all deferred bonus payments shall be immediately payable and all rentals and royalties, including advance royalties, already paid or due, shall be forfeited to the United States.

Subpart 3453—Transfers by Assignment, Sublease or Otherwise

§ 3453.1 Qualifications.

§ 3453.1-1 Who may transfer or receive a transfer.

(a) Leases may be transferred in whole or in part to any person, association or corporation qualified to hold such leases, except as provided by §§ 3420.1-4(b)(1)(iii) and 3420.1-4(b)(2)(ii) of this title.

(b) A minor is not qualified to hold a lease and transfers to a minor shall not be approved. However, a transfer in behalf of a minor heir or devisee of a lessee to a legal guardian or trustee may be approved.

§ 3453.1-2 Number of copies required.

A single signed copy of the qualifications required under subpart 3472 of this title is sufficient.

3453.1-3 Sole party in interest.

The transferee or transferees shall comply with § 3472.2-1 of this title.

§ 3453.1-4 Attorney-in-fact.

The attorney-in-fact shall comply with § 3472.2-3 of this title.

3453.1-5 Heirs and devisees.

An appropriate showing as required under § 3472.2-4 of this title shall be furnished before the heirs or devisees of a deceased holder of a lease, operating agreement, or royalty interest in a lease can be recognized by the Secretary as the new holders of a lease, agreement, or interest.

§ 3453.2 Requirements.

§ 3453.2-1 Application.

Applications for transfers of leases, whether by direct assignments, working agreements, transfer of royalty interests, subleases or otherwise, shall be filed for approval within 90 days from final execution.

§ 3453.2-2 Forms and statements.

(a) Transfers of any interest shall be filed in triplicate.

(b) No specific form need be used for requests for apporval of transfers. The application shall contain evidence of the transferee's qualifications, including statements on other coal leases held by the transferee. This evidence shall consist of the same showing of qualifications required of a lease applicant by subpart 3472 of this title.

(c) A separate instrument of transfer shall be filed for each lease when transfers involve record titles. When transfers to the same person, association, or corporation involving more than one lease are filed at the same time, one request for approval and one showing as to the qualifications of the transferee shall be sufficient.

(d) A single signed copy of all other instruments of transfer is sufficient, except that collateral assignments and other mortgage documents shall not accepted for filing.

§ 3453.2-3 Filing location and fee.

An application for approval of a transfer shall be filed in the Bureau of Land Management State Office having jurisdiction over the leased lands proposed for transfer (43 CFR Subpart 1821). Each application shall be accompanied by a nonrefundable filing fee (43 CFR 3473.2).

§ 3453.2-4 Bonds.

(a) If a bond is required, it shall be furnished before a lease transfer may be approved. The consent of the surety to the substitution of the transferee as principal or a new bond with the transferee as principal shall be submitted if the original lease required the maintenance of a bond. If the transfer is for part of the leased land only, it shall be for a legal subdivision and (1) the consent of the surety to the transfer and its agreement to remain bound as to the interest retained by the lessee shall be submitted, as well as (2) a new bond with the transferee as principal covering the portion of the leased lands transferred.

(b) The person transferring a lease, including a sublessee, and the surety for the lease shall continue to be responsible for the performance of any obligation under the lease until the effective date of the approval of the transfer. If the transfer is not approved, their obligation to the United States shall continue as though no such transfer had been filed for approval. After the effective date of approval, the transferee, including any sublessee, and the transferee's surety shall be responsible for all lease obligations notwithstanding any terms in the transfer to the contrary.

§ 3453.2-5 Description of lands.

The description of the lands involved in the instrument of transfer shall match the description of lands in the lease. The approval of transfer of only a part of the lands described in a lease shall create a new lease. The transfer of only a part of the lands shall be permitted only where it is demonstrated that each remaining lease area is a logical mining unit or part of a logical mining unit.

§ 3453.3 Approval.

§ 3453.3-1 Conditions for approval.

No transfer shall be approved if:

(a) the transferee is not qualified to hold a lease under subpart 3472 of this title;

(b) the lease bond is insufficient;

(c) the filing fee has not been submitted;

(d) the transferee would hold the lease in violation of the acreage requirements set out in subpart 3472 of this title;

(e) the transfer would create an overriding royalty interest in violation of § 3473.3 of this title; or

(f) the lease account is not in good standing.

§ 3453.3-2 Disapproval of transfers.

The authorized officer shall deny an application for approval of a transfer if any reason why the transfer cannot be approved (listed in § 3454.3-1 of this title) is not cured within the time established by the authorized officer in a decision notifying the applicant for approval why the transfer cannot be approved.

§ 3453.3-3 Effective date.

A transfer shall take effect the first day of the month following its final approval by the Bureau of Land Management, or if the transferee requests, the first day of the month of the approval.

§ 3453.3-4 Extensions.

The filing of or approval of any transfer shall not alter any terms or extend any time periods under the lease, including those dealing with readjustment of the lease and the diligent development and continued operation on the lease.

PART 3460—ENVIRONMENT

Subpart 3461—Federal Lands Review—Unsuitability for Mining

Sec.

3461.0-3 Authority.
3461.0-6 Policy.
3461.1 Relationship of leasing to unsuitability assessment.
3461.1-1 Application of criteria on unleased lands.
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3461.2 Criteria for assessing and designating lands unsuitable for all or certain types of mining operations.
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Subpart 3465—Surface Management and Protection

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3465.7 Environmental assessment—Postmining land use.

AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C. 351-359; 30 U.S.C. 521-531; 30 U.S.C. 1201 et seq.; and 43 U.S.C. 1701 et seq.

Subpart 3461—Federal Lands Review—Unsuitability for Mining

§ 3461.0-3 Authority.

(a) These regulations are issued under the authority of the statutes listed in § 3400.0-3 of this title.

(b) These regulations primarily implement:

(1) The general unsuitability criteria in section 522(a) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(a));

(2) The Federal lands review in section 522(b) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(b)); and

(3) The prohibitions against mining certain lands in section 522(e) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(e)).

§ 3461.0-6 Policy.

(a) The Department shall carry out the review of Federal lands under section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272) through land use planning assessments by the surface management agency regarding the unsuitability of Federal lands for coal mining.

(b) The Department shall develop sufficient information prior to leasing any tract to be reasonably certain that subsequent operations on any tract can be conducted in compliance with the Surface Mining Control and Reclamation Act of 1977.

(c) All criteria regarding the designation of lands as unsuitable for surface coal mining operations established by the Office of Surface Mining Reclamation and Enforcement under 30 CFR Part 760 shall be used in assessing unsuitability, in addition to the criteria in this subpart.

§ 3461.1 Relationship of leasing to unsuitability assessment.

§ 3461.1 Application of criteria on unleased lands.

(a) The unsuitability criteria shall be applied, prior to lease issuance, to all lands leased after the issuance of these regulations, including emergency leases and noncompetitive (preference right) leases.

(b) The unsuitability criteria shall be initially applied either:

(1) During land use planning or the environmental assessment conducted for a specific emergency lease application, lease modification, or preference right lease application under either § 3425.2 or § 3430.3 of this title; or

(2) During land use planning under the provisions of § 3420.1-5 of this title.

§ 3461.1-2 Application of criteria on leased lands.

(a) For any lease issued prior to the promulgation of these regulations the unsuitability criteria shall be applied to all non-producing leases. The Department may await the lessee's submission of a mining plan before applying the unsuitability criteria. This shall not preclude evaluation of an existing lease as part of the normal land use planning process.

(b) The leased lands shall be reviewed in light of the unsuitability criteria to determine which, if any, apply. If any criterion applies, the specific criterion and any exception to it which applies shall be identified. If a criterion does apply and the conditions do not permit an exception, a further decision shall be made on whether the leased land is exempt from the criterion because of the source of the authority for the criterion. Mining shall be permitted on land to which no criterion applies; on land where a criterion applies but where the conditions permit an exception; and on land to which a criterion applies, no exception applies, but which is exempt from that criterion.

§ 3461.2 Criteria for assessing and designating lands unsuitable for all or certain types of mining operations.

(a)(1) *Criterion.* All Federal lands included in the following land systems or categories and an appropriate buffer zone, if necessary, as determined by the land management agency, shall be considered unsuitable for coal mining: National Park System, National Wildlife Refuge System, National Systems of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, Custer National Forest, and Federal lands in incorporated cities, towns, and villages. All Federal lands which are recommended for inclusion in any of the above systems or categories by the Administration in legislative proposals submitted to the Congress or which are required by statute to be studied for inclusion in such systems or categories shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations may be approved within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted.

(3) *Exemptions.* The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights. The application of the buffer zone portion of this criterion does not apply to lands: to which substantial financial and legal commitments were made prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(b)(1) *Criterion.* Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, or for agricultural crop production on Federally owned surface shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that:

(i) All or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or

(ii) The right-of-way or easement was granted for mining purposes; or

(iii) The right-of-way or easement was issued for a purpose for which it is not being used; or

(iv) The parties involved in the right-of-way or easement agree to leasing; or

(v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations.

(3) *Exemption.* This criterion does not apply to lands on which mining would result in substantial loss or reduction of long-range productivity of food or fiber products, and it does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(c)(1) *Criterion.* Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public highway or within 100 feet of a cemetery, or within 300 feet of an occupied public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

(2) *Exceptions.* A lease may be issued and mining operations approved for lands:

(i) Used as mine access roads or haulage roads that join the right-of-way for a public road;

(ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated;

(iii) For which owners of occupied buildings have given permission to mine within 300 feet of their buildings.

(3) *Exemption.* The application of this criterion is subject to valid existing rights.

(d)(1) *Criterion.* Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan must consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if authorized by the Federal Land Policy and Management Act of 1976.

(3) *Exemption.* The application of this criterion to lands for which the Bureau of Land Management is the surface management agency is subject to valid existing rights.

(e)(1) *Criterion.* Scenic Federal lands designated by visual resource management analysis as Class I or II (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if the surface management agency determines that mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(f)(1) *Criterion.* Federal lands under permit by the land management agency for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operations approved:

(i) With the concurrence of the principal scientific user or agency; or

(ii) Where it would be stipulated that the mining would be done in such a way as not to jeopardize the purpose of the study as determined by the surface management agency.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(g)(1) *Criterion.* All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance which are included in or eligible for inclusion in the National Register of Historic Sites, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that make it eligible for listing in the National Register) as determined by the land management agency, in consultation with the Advisory Council on Historic Preservation or by procedures approved by the Advisory Council, shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operations approved if the surface management agency determines:

(i) With the concurrence of the state, that the site, structure, or object is of regional or local significance only; or

(ii) In consultation with the Advisory Council on Historic Preservation, that the direct and indirect effects of all or certain stipulated methods of coal mining on a property in or eligible for the National Register of Historic Sites will not result in significant adverse impacts to the site, structure, or object.

(3) *Exemption.* The application of this criterion is subject to valid existing rights.

(h)(1) *Criterion.* Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operation approved in an area or site if the surface management agency determines that:

(i) With the concurrence of the state, the area or site is of regional or local significance only;

(ii) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or

(iii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(i)(1) *Criterion.* Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the surface management agency determines the species and its habitat will not be adversely affected by all or certain stipulated methods of coal mining operations.

(j)(1) *Criterion.* Lands containing habitat deemed critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(k)(1) *Criterion.* A bald or golden eagle nest that is determined to be active and a buffer zone of land in a ¼ mile radius from a nest are areas which shall be considered unsuitable. Consideration of availability of habitat for prey species shall be included in the determination of buffer zones.

(2) *Exceptions.* (i) A lease may be issued and mining operations approved if:

(A) They can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or

(B) Golden eagle nest sites will be moved with the concurrence of the Fish and Wildlife Service.

(ii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

(l)(1) *Criterion.* Bald and golden eagle roost and concentration areas used during migration and wintering shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.

(m)(1) *Criterion.* Federal lands containing falcon cliff nesting sites with active nests and a buffer zone of Federal land in a ¼ mile radius from the nest to provide needed prey habitat

shall be considered unsuitable. Consideration of availability of habitat for prey species shall be included in the determination of buffer zones.

(2) *Exception.* A lease may be issued and mining operations approved where the land management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

(n)(1) *Criterion.* Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

(o)(1) *Criterion.* Federal lands which the land management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Such lands may include appropriate buffer zones as determined jointly by the surface management agency and the state. Such lands shall include:

(i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken;

(ii) The most critical winter ranges for deer, antelope, and elk; and

(iii) Migration corridors for elk.

(2) *Exceptions.* A lease may be issued and mining operations approved if the surface management agency, in consultation with the state wildlife agency, determines that:

(i) Complete mitigation is possible; or

(ii) The species being protected will not be adversely affected by all or certain stipulated methods of coal mining.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(p)(1) *Criterion.* Federal lands containing: (i) inland lakes, impoundments, and associated wetlands;

(ii) Inland shallow, predominantly vegetated wetlands; or

(iii) Riverine wetland systems, lower and upper perennial systems with flow greater than 5 cubic feet per second, and riparian zones in a "relatively undisturbed" state that are larger than one linear mile along a riverine system shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operations approved where the surface management agency determines that:

(i) The use of appropriate stipulated mining or reclamation technology will not significantly affect the wetlands or will provide for complete restoration; or

(ii) The wetlands contain no significant values for groundwater recharge, fish and wildlife habitat, recreation, or scientific study.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(q)(1) *Criterion.* Riverine, coastal, and special floodplains (100-year recurrence interval) shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved where the surface management agency determines that:

(i) Leasing a particular tract and approval of mining operations is the only practicable method of access to coal lands outside the floodplain which are not unsuitable under any other criterion; and

(ii) Potential for harm to people or property and natural and beneficial values of floodplains can be minimized through stipulated use of demonstrated and available mining and mitigation measures.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(r)(1) *Criterion.* Federal lands which have been committed by the land management agency to use as municipal watersheds shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved where:

(i) The surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree; and

(ii) The municipality or water users concur in the issuance of the lease.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(s)(1) *Criterion.* Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands ¼ mile from the outer edge of the far banks of the water, shall be unsuitable.

(2) *Exception.* The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

(t)(1) *Criterion.* When the surface management agency, with the concurrence of the Secretary of Agriculture (Soil Conservation Service), identifies Federal lands having prime farmland soils, such lands shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued when:

(i) Conditions such as soil rockiness, angle of slope or historic or other conditions leading to a negative determination under the permanent regulations of the Office of Surface Mining Reclamation and Enforcement are present; or

(ii) Scientific studies show that crop yields equivalent to pre-mining crop yields on non-mined prime farmlands in the surrounding area under equivalent levels of management could be obtained and that an operator or potential operator could meet the soil reconstruction standards in section 515(b)(7) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1265(b)(7)), and the permanent regulations of the Office of Surface Mining Reclamation and Enforcement.

(u)(1) *Criterion.* Federal lands identified by the surface management agency, with the concurrence of the State in which they are located, as alluvial valley floors according to the definition and standards in the permanent regulations under the Surface Mining Control and Reclamation Act of 1977, and the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

(2) *Exception.* A lease may be issued where all or certain methods of coal mining would not interrupt, discontinue, or preclude farming on land to which the first sentence of the criterion applies.

(v)(1) *Criterion.* As information regarding reclaimability on a local or regional basis becomes available, the surface management agency shall use such information to determine if areas of Federal land are reclaimable to the standards of the Surface Mining Control and Reclamation Act of 1977, the regulations, and approved state programs. Examples of information on reclaimability would be soil studies, hydrologic studies, and studies concerning revegetation. If any area is determined not to be so reclaimable, such area shall be considered unsuitable.

(2) *Exception.* A lease may be issued upon presentation of information which contains results of studies showing that reclamation is possible to the standards in the permanent regulations of the Office of Surface Mining Reclamation and Enforcement, and an approved state program, including state regulations.

(w)(1) Criterion. Federal lands in a state to which is applicable a criterion (i) proposed by the state, and (ii) adopted by rulemaking by the Secretary of the Interior, shall be considered unsuitable for coal mining.

(2) *Exceptions.* A lease may be issued when:

(i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft land use plan, or supplement to a land use plan, for the area in which such land is included, or

(ii) The surface management agency, in consultation with the state, determines that, although the criterion applies, mining will not adversely affect the value which the criterion would protect.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(x)(1) Criterion. A buffer zone of Federal lands necessary to provide protection for any adjacent area designated as land unsuitable for mining by the state shall be considered unsuitable.

(2) *Exception.* The buffer zone may be modified or eliminated where the surface management agency, in consultation with the state, determines that all or parts of the zone are not necessary to protect the designated area.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

§ 3461.3 Exploration.

(a) Assessment of any area as unsuitable for coal mining pursuant to sections 522 and 523 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272, 1273) and the regulations of this subpart does not prohibit exploration of such area for coal under subpart 3410 of this title.

(b) An application for an exploration license on any lands assessed as unsuitable for coal mining shall be reviewed by the Bureau of Land Management to ensure that exploration does not harm any value for which the area has been assessed as unsuitable.

§ 3461.4 Unsuitability assessment procedures.

§ 3461.4-1 Assessment and land use planning.

(a) The authorized officer of the surface management agency shall describe in the land use plan the results of the application of each of the unsuitability criteria to the planning area. The authorized officer shall state each instance in which a criterion if found to be applicable and show the area which is excluded from leasing, or, should the authorized officer determine that the conditions for an exception exist, describe the area to which the exception applies and discuss in detail the reasons why the exception is made and what type of conditions or stipulations will be required in any lease or mining permit to assure compliance with the exception.

(b) The authorized officer shall make his assessment on the best available data that can be obtained given the time and resources available to prepare the plan. The plan shall also disclose when during activity planning or lease sale activities, or prior to approval of a permit to conduct surface mining operations, the data needed to make an assessment with reasonable certainty would be generated. When that data is obtained, the authorized officer shall make public his assessment on the application of each criterion and the reasons therefor in the land use plan, whether or not additional data are needed. The documentation in the plan should explain whether additional data would be likely to affect significantly the conclusions reached about unsuitability.

(c) All lands not assessed as unsuitable for all methods of coal mining may be considered further in the land use planning and activity planning processes. All lands assessed as unsuitable for certain methods of coal mining may be considered in these processes with the condition that those methods of coal mining would not be authorized.

§ 3461.4-2 Consultation with State and local governments.

Prior to assessing Federal lands as unsuitable for coal mining, the Secretary shall consult with the appropriate state and local agencies (43 CFR 3420.2-6).

§ 3461.4-3 Findings.

Prior to assessing Federal lands as unsuitable, the Secretary shall prepare a detailed statement for such lands on (a) the potential coal resources, (b) the demand for coal resources, and (c) the impact of such designation on the environment, the economy, and the supply of coal.

§ 3461.4-4 Petitions to designate lands.

Petitions for designation or termination of a designation of Federal lands as unsuitable for coal mining shall be processed by the Office of Surface Mining Reclamation and Enforcement under 30 CFR Part 769.

§ 3461.4-5 Underground mining exception.

Federal lands with coal deposits that would be mined by underground mining methods shall not be considered unsuitable for coal mining where there will be no surface coal mining operations, as defined in § 3400.0-5 of this title. Where underground mining will include surface operations and surface impacts on Federal lands to which a criterion applies, it shall be considered unsuitable unless the surface managing agency finds that a relevant exception or exemption applies. Surface impacts include surface occupancy, subsidence, fire, and other environmental impacts of underground mining which are manifested on the surface.

§ 3461.4-6 Land exclusion.

After a land use plan is completed, the Department may exclude additional lands from consideration for leasing, or reassess lands as acceptable for further consideration for leasing, as warranted by new information, including action by the Office of Surface Mining Reclamation and Enforcement on a petition to designate lands unsuitable or to terminate a designation of unsuitability, without formally revising the plan. A description of any lands so excluded shall be added to the documentation developed during the tract analysis phase of activity planning (43 CFR 3420.4).

Subpart 3465—Surface Management and Protection

§ 3465.0-1 Purpose.

This subpart establishes rules for the management and protection of the surface of the Federal lands when coal deposits are developed.

§ 3465.0-2 Objective.

This subpart is designed to ensure the use of effective and reasonable coal mining operations, and the reclamation of mined lands in a manner that will minimize any adverse social, economic, and environmental effects of coal mining.

§ 3465.0-3 Authority.

These regulations are issued under the authority of the statutes listed in § 3400.0-3 of this title.

§ 3465.0-7 Applicability.

This subpart applies to leases and licenses to mine, issued by the Bureau of Land Management for the development of Federal coal.

§ 3465.1 Use of surface.

(a) The operator shall use only that part of the surface area included in his lease or license that has been included in an approved permit (30 CFR Part 741).

(b) Separate leases, permits, or rights-of-way under the appropriate provisions in Title 43 of the Code of Federal Regulations are required for the installation of power generation plants or commercial or industrial facilities on the lands in the lease or license to mine or for the use of mineral materials or timber from the land in the lease or license to mine.

(c) Other land uses under other authorities may be allowed on an area in a lease or license to mine provided there is no unreasonable conflict and that neither the mining operation nor the other use is endangered by the presence of the other.

§ 3465.2 Obligations and standards of performance.

(a) A lessee or a holder of a license to mine shall comply with the regulations in this subpart and with the terms and conditions of the lease or license.

(b) A lessee or a holder of a license to mine shall comply with the applicable performance standards in 30 CFR Chapter VII, Subchapter D, and 30 CFR 211.

(c) When changed conditions or newly discovered information indicate that an approved permit (30 CFR Part 741) needs to be reviewed or supplemented, the authorized officer may propose the appropriate revision or supplement to the Office of Surface Mining Reclamation and Enforcement.

(d) The authorized officer may develop and include additional specific stipulations in any lease or license to mine involving special management consideration.

§ 3465.3 Inspections and noncompliance.

§ 3465.3-1 Inspections.

The authorized officer, Mining Supervisor, or inspectors from the Office of Surface Mining Reclamation and Enforcement shall have the right to enter lands under a lease or license to mine at any reasonable time.

§ 3465.3-2 Discovery of noncompliance.

(a) Upon discovery of activities that are not in compliance with the terms of a lease or license to mine, or with an approved permit (30 CFR 741), but that do not pose a serious and immediate threat to public health and safety or to natural resources and environmental quality, the authorized officer shall refer the matter to the Office of Surface Mining Reclamation and Enforcement for remedial action, or to the Mining Supervisor on matters of exploration.

(b) Upon discovery of activities that are not in compliance with the terms of a lease, license to mine, or an approved permit and that do pose a serious and immediate threat to public health and safety or to resources and environmental quality, the authorized officer may order the immediate cessation of the threatening activities, provided that the Office of surface Mining Reclamation and Enforcement is immediately informed of the issuance of any such emergency cessation order.

§ 3465.3-3 Failure of lessee or holder of license to mine to act.

Failure of a lessee or the holder of a license to mine to comply with an emergency cessation order issued under § 3465.3-1(b) or with a written notice of noncompliance issued by the Office of Surface Mining Reclamation and Enforcement in accordance with 30 CFR Part 211 or 30 CFR Chapter VII, Subchapter D, shall be grounds for suspension of the permit and may be grounds for cancellation of the lease or license to mine, in accordance with subpart 3452 of this title.

§ 3465.4 Alternative postmining land use.

When a lessee, holder of a license to mine, or permit applicant proposes any postmining land use that is substantially different from the land use prior to exploration and mining, the Office of Surface Mining Reclamation and Enforcement, with the approval of the authorized officer of the appropriate surface management agency, may approve such alternative postmining land use. The authorized officer shall not approve the alternative postmining land use unless it:

(a) Does not conflict with land use plans for the area in the lease or license to mine and surrounding lands;

(b) Is considered an equal or better economic or public use of the land as compared to the premining use of the land;

(c) Does not, as determined by the authorized officer, cause a significant adverse impact upon the aesthetic character of the land or the lives of people who inhabit the area immediately surrounding the land in the lease or license to mine; and

(d) Is approved by the legal owner of the surface where the surface is privately owned.

§ 3465.5 Bonding.

(a) Bonding for compliance with the terms of a lease or license to mine shall be furnished in accordance with the applicable provisions of subpart 3474 of this title.

(b) A reclamation bond shall be secured in accordance with 30 CFR Part 742.

(c) A lease or license to mine may be denied any applicant or successful bidder who has previously forfeited a bond because of failure to comply with an approved plan (30 CFR Part 741) or permit unless the affected lands covered by that plan or permit have been reclaimed without cost to the Federal Government. Nothing in this section shall modify or limit the discretionary authority of the authorized officer to deny for other causes any successful bid or application for a lease or license to mine.

§ 3465.6 Conduct, completion, and abandonment of operations.

All terms of the permit shall be administred under 30 CFR Chapter VII, Subchapter D, and 30 CFR 211.

§ 3465.7 Environmental assessment—Postmining land use.

If the Director of the Office of Surface Mining Reclamation and Enforcement determines that a decision to approve any alternative postmining land use or alternative rehabilitation practices would constitute a major Federal action requiring an environmental statement under section 102(2)(C) of the National Environmental Policy Act (42 U.S.C. 4332(2)(C)) and that the decision has not been discussed in any environmental statement that may have been prepared for the issuance of the lease or the approval of the permit, a statement shall be prepared by the Director of the Office of Surface Mining Reclamation and Enforcement.

PART 3470—COAL MANAGEMENT PROVISIONS AND LIMITATIONS

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AUTHORITY: 30 U.S.C. 181 et seq. and 30 U.S.C. 351-359

Subpart 3471—Coal Management Provisions and Limitations

§ 3471.1 Land description requirements.

§ 3471.1-1 Land description and coal deposit in application.

Any application for a lease, lease modification, or license to mine shall include a complete and accurate description of the lands for which the lease, modification, or license to mine is desired.

(a) If the land has been surveyed under the public land rectangular system, each application shall describe the land by legal subdivision (section, township, and range), or aliquot part thereof (but not less than 10 acres).

(b) Where protraction surveys have been approved and the effective date has been published in the FEDERAL REGISTER, the application for land shown on such protraction surveys and filed on or after the effective date shall contain a description of the land according to the section, township, and range shown on the approved protraction surveys.

(c)(1) If the land has not been surveyed on the ground and is not shown on the records as covered by protraction surveys, the application shall describe the land by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, in cardinal directions except where the boundaries of the land are in irregular form, and connected by courses and distances to an official corner of the public land surveys. In Alaska, the description of unsurveyed land shall be connected by courses and distances to either an official corner of the public land surveys or to a triangulation station established by an agency of the United States such as the Geological Survey, the Coast and Geodetic Survey, or the International Boundary Commission, if the record position is available to the general public.

(2) If the land is acquired land which has not been surveyed under the rectangular system of public land surveys, and the tract is not within the area of the public land surveys, the land shall be described as in the deed or other document by which the United States acquired title to the lands or minerals.

(i) If the land constitutes less than the entire tract acquired by the United States, it shall be described by courses and distances between successive angle points on its boundary tying by course and distance into the description in the deed or other document by which the United States acquired title to the land.

(ii) If the description in the deed or other document by which the United States acquired title to the land does not include the courses and distance between the successive angle points on the boundary of the desired tract, the description in the application shall be expanded to include such courses and distances.

(iii) The application shall be accompanied by a map on which the land is clearly marked showing its location with respect to the administrative unit or project of which it is a part. It is not necessary to submit a map if the land has been surveyed under the rectangular system of public land surveys, and the land description can be conformed to that system.

(iv) If an acquisition tract number has been assigned by the acquiring agency to the tract, a description by tract number will be accepted.

(v) Any accreted land not described in the deed to the United States shall be described by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, and connected by courses and distances to an angle point on the perimeter of the acquired tract to which the accretions belong.

§ 3471.1-2 Land description in lease.

All lands in a public land survey system State shall have a cadastral survey performed at Federal Government expense before a lease or license to mine may be issued, except for areas covered by a skeleton survey, i.e. Utah and Alaska, and the lease when issued shall be described by legal subdivision (section, township, and range), or aliquot part thereof (but no less than 10 acres).

§ 3471.2 Effect of land transactions.

§ 3471.2-1 Disposal of land with a reservation of minerals.

(a) Where the lands included in a lease or license to mine have been or may be disposed of with reservation of the coal deposits, a lessee or the holder of a license to mine must comply fully with the law under which the reservation was made. See, among other laws, the Acts of March 3, 1909 (34 Stat. 844; 30 U.S.C. 81); June 22, 1910 (35 Stat. 583; 30 U.S.C. 83-85); December 29, 1916, as amended (39 Stat. 862; 43 U.S.C. 291-301); June 17, 1949 (63 Stat. 200); June 21, 1949 (63 Stat. 214; 30 U.S.C. 54); March 8, 1922 (42 Stat. 415; 48 U.S.C. 376-377); and October 21, 1976 (90 Stat. 2759; 43 U.S.C. 1719).

(b) Any sale or conveyance of lands subject to the Mineral Leasing Act for Acquired Lands by the agency having jurisdiction shall be subject to any lease or license to mine previously issued under that act.

(c) Leases on acquired lands outstanding on August 7, 1947, and covering lands subject to the Minearal Leasing Act for Acquired Lands may be exchanged for new leases to be issued under that act subject in each case to such appropriate conditions as may be prescribed.

(d) When: (1) the coal is to be mined by other than underground mining techniques, (2) the surface of the land is owned by a qualified surface owner, and (3) the lease is issued after August 3, 1977, the lessee shall comply with the terms of the written consent of the qualified surface owner not inconsistent with Federal and state mined

land reclamation laws and regulations (43 CFR 3420.6).

§ 3471.2-2 Effect of conveyance to State or local entity.

(a) If the United States has conveyed the title to, or otherwise transferred control of the land surface containing the coal deposits to, (1) any state or political subdivision, agency, or its instrumentality; (2) a college, any other educational corporation, or association, or (3) to a charitable or religious corporation or association, the transferee shall be notified by certified mail of the application for the license to mine or lease, or the scheduling of a lease sale. The transferee shall be given a reasonable period of time within which to suggest any stipulations necessary for the protection of existing surface improvements or uses to be included in the license or lease and state the supporting facts, or to file any objections to its issuance and state the supporting facts.

(b) If the state or local entity opposes the issuance of the license to mine or lease, the facts submitted in support of the opposition must be carefully considered and each case separately decided on its merits. Opposition by the state or local entity is not a bar to issuance of the license to mine or lease for the reserved minerals in the lands. (See, however, § 3461.2(b).) In each case, the final determination on whether to issue the license to mine or lease is based on the best interests of the public.

§ 3471.3 Cancellation or forfeiture.

§ 3471.3-1 Cancellation or forfeiture for cause.

Any lease or license to mine may be cancelled or forfeited for violation of the act under which the lease or license to mine was issued, applicable Federal regulations, or the terms of the lease or license to mine (43 CFR 3452.2).

§ 3471.3-2 Protection of bona fide purchaser.

(a) The Secretary's right to cancel or forfeit a lease for any violation shall not adversely affect the title or interest of a bona fide purchaser of any lease or any interest therein. A bona fide purchaser must be a person, association, or corporation qualified to hold such lease or interest, even though the holdings of the party or parties from which the lease or interest therein was acquired or their predecessor(s) in title (including the original lessee of the United States), may have been cancelled or forfeited for any such violation.

(b) Any party to any proceedings with respect to a violation of any provision of the mineral leasing laws has the right to be dismissed promptly as a party by showing that he or she holds and acquired his or her interest as a bona fide purchaser without having violated any provisions of the mineral leasing laws. No hearing shall be necessary on such showing unless prima facie evidence is presented to indicate a possible violation on the part of the alleged bona fide purchaser.

(c) If, during any such proceeding, a party waives his or her rights under the lease, or if such rights are suspended by order of the Secretary pending a decision, rental payments and time counted against the term of the lease shall be suspended as of the first day of the month following the filing of the waiver or the Secretary's suspension until the first day of the month following the final decision in the proceeding or the revocation of the waiver or suspension.

§ 3471.3-3 Sale of underlying interests.

If, in any proceeding to cancel or forfeit a lease or any interest therein acquired in violation of any of the provisions of the mineral leasing laws, the lease or interest therein is cancelled or forfeited, and if there are valid options to acquire the lease or an interest therein that are not subject to cancellation, forfeiture, or compulsory disposition, this lease or interest therein shall be sold to the highest responsible qualified bidder by competitive bidding, in a manner similar to that provided for in the offering of leases by competitive bidding, subject to all outstanding valid interests and options. If less than the whole interest in the lease or interest therein is cancelled or forfeited, the partial interest shall be sold in the same way. If no satisfactory offer is obtained as a result of the competitive offering of a whole or partial interest, it may be sold by other methods that the authorized officer finds appropriate. However, the terms shall not be less favorable to the Government than those of the best competitive bid received.

§ 3471.4 Future interest, acquired lands.

An application to lease lands in which the United States has a future interest filed less than one year prior to the date of the vesting in the United States of the present interest in the coal shall be rejected. Upon the vesting in the United States of the present possessory interest in the coal, all applications for future interest leases outstanding at the time shall automatically lapse. Only applications for a present interest lease shall be considered after that time.

Subpart 3472—Qualification Requirements

§ 3472.1 Qualified applicants and bidders.

A lease may be issued only to (a) citizens of the United States; (b) associations of citizens organized under the laws of the United States or of any state thereof, which are authorized to hold such interests by the statute under which they are organized and by the instrument establishing their association; (c) corporations organized under the laws of the United States or of any state thereof, including a company or corporation operating a common carrier railroad; and (d) public bodies, including municipalities.

§ 3472.1-1 Special qualification provisions.

(a) Each applicant or bidder for a lease shall furnish a signed statement showing that, with the area applied or bid for, the applicant or bidder's interests in leases and lease applications, held directly or indirectly, do not exceed in the aggregate the acreage limitation in § 3472.1-2 of this title.

(b) A lease or license to mine shall not be issued to a minor but may be issued to a legal guardian or trustee on behalf of a minor.

(c) Every company or corporation operating a common carrier railroad shall make a statement that it needs the coal for which it seeks a lease solely for its own railroad use; that it operates main or branch lines in the state in which the lands involved are located; that the aggregate acreage in the leases and applications in which it holds an interest, directly or indirectly, does not exceed 10,240 acres; and that it does not hold more than one lease for each 200 miles of its railroad lines served or to be served from such coal deposits. This last requirement excludes spurs or switches, branch lines built to connect the leased coal with the railroad, and parts of the railroad operated mainly by power not produced by steam.

(d) Aliens may not acquire or hold any direct or indirect interest in licenses to mine or leases, except that they may own or control stock in corporations holding leases if the laws of their country do not deny similar or like privileges to citizens of the United States. If any appreciable percentage of stock of a corporation is held by aliens who are citizens of a country denying similar or like privileges to United States citizens, that corporation's application or bid for a lease shall be rejected.

(e) A license to mine may not be issued to a private corporation.

§ 3472.1-2 Acreage limitations.

(a)(1) No person, association, or corporation, or any subsidiary, affiliate, or person controlled by or under common control with such person, as-

sociation, or corporation shall take, hold, own, or control at one time Federal coal leases, lease applications, or bids on more than 46,080 acres in any one state and in no case on more than 100,000 acres in the United States.

(2) No person, association, or corporation holding, owning, or controlling leases, lease applications or bids (individually or through any subsidiary, affiliate, or person under common control) on more than 100,000 acres in the United States on August 4, 1976, shall be required to relinquish any lease or lease application held on that date. However, it shall not be permitted to hold any additional interests in any further leases or lease applications until such time as its holdings, ownership, or control of leases or applications has been reduced below 100,000 acres within the United States.

(b)(1) In computing acreage held, owned, or controlled, the accountable acreage of a party owning an undivided interest in a lease shall be the party's proportionate part of the total lease acreage. The accountable acreage of a party owning an interest in a corporation or association shall be the party's proportionate part of the corporation's or association's accountable acreage. However, no person shall be charged that person's pro rata share of any acreage holdings of any association or corporation unless that person is the beneficial owner of more than 10 percent of the stock or other instruments of ownership or control of such association or corporation.

(2) On acquired lands, if the United States owns only a fractional interest in the coal resources of the lands involved, only that part of the total acreage involved in the lease, proportionate to the extent of ownership by the United States of the coal resources, shall be charged as acreage holdings. The acreage embraced in a future interest lease is not to be charged as acreage holdings until the lease for the future interest takes effect.

§ 3472.2 Filing of qualification statements.

§ 3472.2-1 Sole party in interest statement.

Every applicant or bidder for a lease or license to mine shall submit to the Bureau of Land Management State Office having jurisdiction over the lands (43 CFR Subpart 1821) at the time of filing the application or bid a signed statement that the applicant is the sole party in interest in the application or bid, and the lease or license to mine, if issued. If the applicant or bidder is or will not be the sole party in interest, the applicant or bidder shall set forth the names of the other interested parties in the application or bid. A separate or joint statement shall be signed by them and by the applicant or bidder setting forth the nature and extent of the interest of each in the application or bid, the nature of the agreement between them, if oral, and a copy of such agreement if written. Such separate or joint statement of interest and written agreement, if any, or a statement of the nature of such agreement, if oral, shall accompany the application or bid. All interested parties shall furnish evidence of their qualifications to hold such interest in the lease or license to mine including a statement regarding knowledge of written consent from any qualified surface owner for the area involved (43 CFR Part 3427).

§ 3472.2-2 Contents of qualification statement.

(a) If the applicant or bidder is an individual, he shall submit a signed statement setting forth his citizenship with each application or bid for a license to mine or lease.

(b) If the applicant or bidder is an association or partnership, the application or bid shall be accompanied by a certified copy of its articles of association or partnership, together with a statement showing (1) that it is authorized to hold a lease or license to mine; (2) that the member or partner executing the lease or license to mine is authorized to act on behalf of the association or partnership in such matters; (3) the names and addresses of all members owning or controling more than 10 percent of the association or partnership and their citizenship and holdings.

(c) If the applicant or bidder for a lease or license to mine is a corporation, it must submit statements showing (1) the state of incorporation; (2) that the corporation is authorized to hold leases or licenses to mine; (3) the names of the officers authorized to act on behalf of the corporation; (4) the percentage of the corporation voting stock and all of the stock owned by aliens or those having addresses outside of the United States; and (5) the name, address, citizenship, and acreage holdings of any stockholder owning or controlling 10 percent or more of the corporate stock of any class. If more than 10 percent of the stock is owned or controlled by or on behalf of aliens, or persons who have addresses outside of the United States, the corporation shall provide their names and addresses, the amount and class of stock held by each such person, and to the extent known to the corporation or which can be reasonably ascertained by it, the facts as to the citizenship of each such person. Any applicant who has previously filed a qualification statement may submit either a serial number reference to the record and office where the statement is filed or a new qualification statement. Applications on behalf of a corporation shall be accompanied by proof of the signatory's authority to execute the instrument except in a case where an officer of a corporation signs an application on behalf of the corporation.

(d) To qualify as a small business for the purpose of bidding on any tract to be offered as part of a special opportunity lease sale for small businesses, the bidder shall submit evidence demonstrating qualification under 13 CFR 121.

(e) Where there is a legal guardian or trustee, the following shall be provided: a certified copy of the court order authorizing the guardian or trustee to act as such and to fulfill in behalf of the minor or minors all obligations of the lease or obligations arising thereunder; and statements by the guardian or trustee as to the citizenship and holdings of each of the minors and as to the trustee's own citizenship and holdings, including holdings for the benefit of other minors.

§3472.2-3 Signature of applicant.

Every application or bid for a lease or license to mine shall be signed by the applicant or bidder or by its attorney-in-fact. If executed by an attorney-in-fact the application or bid shall be accompanied by the power of attorney and the applicant's own statement as to citizenship and acreage holdings unless the power of attorney specificially authorizes and empowers the attorney-in-fact to make such statement or to execute all statements which may be required under these regulations.

§3472.2-4 Special qualifications, heirs, and devisees (estates).

If an applicant or bidder for a license to mine or a lease dies before the license to mine or lease is issued, the license or lease shall be issued: if the estate has not been probated, to the executor or administrator of the estate; if probate has been completed, or is not required, to the heirs or devisees; and if there are minor heirs or devisees, to their legal guardian or trustee. The lease or license to mine shall not issue until the following information has been filed:

(a) Where probate of the estate has not been completed: (1) evidence that the person who acts as executor or administrator has the authority to act in that capacity and to act on the application or bid; (2) evidence that the heirs or devisees are the heirs or devisees of the deceased applicant or bidder, and are the only heirs or devisees of the deceased; and (3) a statement over the signature of each heir or devisee concerning citizenship and holdings.

(b) Where the executor or administrator has been discharged or no probate proceedings are required: (1) a certified copy of the will or decree of distribution, if any, and if not, a statement signed by the heirs that they are the only heirs of the applicant or bidder, and citing the provisions of the law of the deceased's last domicile showing that no probate is required; and (2) a statement over the signature of each of the heirs or devisees with reference to citizenship and holdings, except that if the heir or devisee is a minor, the statement shall be over the signature of the guardian or trustee.

§3472.2-5 Special qualifications, public bodies.

(a) To qualify to bid for a lease on a tract offered for sale under §3420.1-4 of this title, a public body shall submit:

(1) Evidence of the manner in which it is organized;

(2) Evidence that it is authorized to hold a lease;

(3) Evidence that the action proposed has been duly authorized by its governing body; and

(4) A definite plan to produce energy within the next 10 years solely for its own use or for sale to its members or customers (except for short-term sales to others).

(b) To obtain a license to mine, a municipality shall submit with its application:

(1) Evidence of the manner in which it is organized;

(2) Evidence that it is authorized to hold a license; and

(3) Evidence that the action proposed has been duly authorized by its governing body.

(c) To qualify to bid for a lease on a tract of acquired land set apart for military or naval purposes, a governmental entity shall submit:

(1) Evidence of the manner in which it is organized, including the state in which it is located;

(2) Evidence that it is authorized to hold a lease;

(3) Evidence that the action proposed has been duly authorized by its own governing body; and

(4) Evidence that it is producing electricity for sale to the public in the state where the lands to be leased are located.

(d) If the material required in paragraphs (a), (b), or (c) of this section has previously been filed, a reference to the serial number of the record in which it has been filed, together with a statement as to any amendments, shall be accepted.

Subpart 3473—Fees, Rentals, and Royalties

§3473.1 Payments.

§3473.1-1 Form of payment.

Payments shall be made in cash, or by money order, check, certified check, bank draft, or bank cashier's check payable to the Bureau of Land Management or Geological Survey, as appropriate.

§3473.1-2 Where paid.

(a) Payments for all licenses to mine shall be paid to the Bureau of Land Management State Office having jurisdiction over the land (43 CFR Subpart 1821).

(b) Payments of all rentals for nonproducing leases shall be paid to the Bureau of Land Management State Office having jurisdiction over the land (43 CFR Subpart 1821).

(c) Rentals and royalties on producing leases shall be paid to the Geological Survey Mining Supervisor for the area in which the lands under lease are situated.

§3473.1-3 When paid.

First year's rental for preference right leases shall be remitted at the time of filing the applications. First year's rental for competitive leases shall be payable when required by decision. Thereafter, rental for all leases shall be paid in accordance with the lease provisions.

§3473.2 Fees.

§3473.2-1 General fee provisions.

A filing fee of $250.00 must accompany each application for an emergency lease, exploration license, and lease modification. A filing fee of $50.00 must accompany each application for approval of any transfer of a lease or an interest therein. The fee shall be retained as a service charge even if the application is rejected or withdrawn in whole or in part. An application not accompanied by the filing fee will not be accepted for filing; it will be returned to the applicant without action.

§3473.2-2 Exemptions from fee provisions.

No filing fee is required for:

(a) Licenses to mine to relief agencies as described in subpart 3440 of this title; or

(b) Preference right lease applications.

§3473.3 Rentals and royalties.

§3473.3-1 Rentals.

(a) The annual rental per acre or fraction thereof on any lease issued or readjusted after the promulgation of this subpart shall not be less than $3. The amount of the rental will be specified in the lease.

(b) Until a lease issued before August 4, 1976, is readjusted, the rental paid for any year shall be credited against the production or advance royalties for that year.

(c) On leases issued or readjusted after August 4, 1976, rental payments may not be credited against royalties.

§3473.3-2 Royalties.

(a)(1) Royalty rates shall be determined on an individual case basis prior to lease issuance and upon lease readjustment. For competitive leases, initial royalty rates shall be set out in the notice of lease sale.

(2) A lease shall require payment of a royalty of not less than 12½ percent of the value of the coal removed from a surface mine.

(3) A lease shall require payment of royalty of not less than 8 percent of the value of the coal removed from an underground mine, except that the authorized officer may determine a lesser amount, but in no case less than 5 percent if conditions warrant.

(4) The value of coal removed from a mine is defined for royalty purposes in 30 CFR 211.63.

(b)(1) The Mining Supervisor shall have the discretion, upon the request of the lessee, to authorize the payment of an advance royalty in lieu of continued operation for any particular year.

(2) The advance royalty for each lease shall be based on a percentage of the value of a minimum number of tons of coal, and the percentage shall not be less than the percentage prescribed in that lease for the production royalty. For any lease issued after August 4, 1976, the minimum number of tons shall be determined on a schedule sufficient to exhaust the leased reserves in 40 years from the approval date of the LMU mining plan of which the lease is a part; for any lease issued before August 4, 1976, the minimum number of tons shall be determined on a schedule sufficient to exhaust the leased reserves in 40 years from June 1, 1976.

(3) The use of advance royalties in lieu of continued operation shall not be permitted for more than a total of 10 years during the life of any lease, including the life of the lease after readjustment. No payment of an advance royalty during the first 20 years of a lease issued after August 4, 1976, may be used as credit against production royalty due after the 20th year of that lease.

(4) The Mining Supervisor may, upon notifying the lessee six months in advance, cease to accept advance royalties in lieu of the requirement of continued operation.

(c) An overriding royalty interest shall not be created by a lease transfer, surface owner consent, or otherwise (1) that exceeds 50 percent of the rate of royalty first payable to the United States under the lease or (2) that, when added to any other overriding royalty interest, exceeds that percentage. Where an interest in the leasehold or operating agreement is transfeerred, the transferor may retain an overriding royalty in excess of the above limitation if he shows to the satisfaction of the Bureau of Land Management that he has made substantial investments for improvements on the land covered by the transfer that would justify a higher payment.

(d)(1) In order to encourage the greatest ultimate recovery of coal, and in the interest of conservation, the Secretary, whenever he determines it necessary to promote development or finds that the lease cannot be successfully operated under its terms may waive, suspend, or reduce the rental or minimum royalty, but not advance royalty, or reduce the royalty on an entire leasehold, or on any deposit, tract, or portion thereof, except that in no case shall the royalty be reduced below 12½ percent for surface mined coal, or 5 percent for underground coal.

(2) An application for any of the above benefits shall be filed in triplicate in the office of the Mining Supervisor. The application shall contain the serial number of the lease, the Bureau of Land Management State Office, the name of the record title holder and any operator or sublessee, and the description of the lands in the manner provided by § 3471.1 of this title.

(i) Each application shall include the number and location of the mine, a map showing the extent of the mining operations, a tabulated statement of the coal mined and subject to royalty for each month covering a period of not less than 12 months immediately prior to the date of filing of the application, and the average production per day mined for each month, with complete information as to why the minimum production or continued operation requirement was not met.

(ii) Each application shall contain a detailed statement of expenses and costs of operating the entire lease, the income from the sale of coal, and all facts indicating whether the mines can be successfully operated upon the royalty or rental fixed in the lease. Where the application is for a reduction in royalty, full information shall be furnished as to whether royalties or payments out of production are paid to parties other than the United States, the amounts so paid, and efforts made to reduce them, if any.

(iii) The applicant shall also file a copy of agreements between the lessee and the holders of any royalty interests to a permanent reduction of all other royalties from the leasehold so that the total royalties owed the holders of royalty interests will not be in excess of one-half of the Government royalties, should the royalty reduction be granted.

§ 3473.4 Suspension of operations, production, and payment obligations.

(a) Application by a lessee for relief from any operating and producing requirements of a lease shall be filed in triplicate in the office of the Mining Supervisor. By Department Order No. 2699 and Geological Survey Order No. 218 of August 11, 1952, the Mining Supervisor is authorized to act on applications for suspension of operations or production, or both, filed pursuant to this section and to terminate suspensions of this kind which have been or may be granted.

(b) The term of any lease shall be extended by adding thereto any period of suspension of all operations and production during such term in accordance with any direction or assent of the Mining Supervisor.

(c) A suspension shall take effect as of the time specified in the direction or assent of the Mining Supervisor. Rental and minimum royalty payments will be suspended during such period of suspension of all operations and production, beginning with the first day of the lease month on which the suspension of operations and production becomes effective. If the suspension of operations and production becomes effective on any date other than the first day of the lease month, rental and minimum royalty payments shall be suspended beginning with the first day of the lease month following such effective date. The suspension of rental and minimum royalty payments shall end on the first day of the lease month in which operations or production is resumed. Where rentals are creditable against royalties and have been paid in advance, proper credit shall be allowed on the next rental or royalty due under the lease.

(d) The minimum annual production requirements of a lease shall be proportionately reduced for that portion of a lease year for which suspension of operations and production is directed or granted by the Secretary in the interest of conservation.

(e) A suspension under this section shall not be granted on a lease issued after August 4, 1976, on which the lessee has not met its diligent development obligations unless administrative action caused the lessee's delay or failure to comply with those obligations.

Subpart 3474—Bonds

§ 3474.1 Bonding requirements.

(a) Before a lease or license to mine may be issued, one of the following forms of compliance bond shall be furnished:

(1) Corporate surety bonds;

(2) Cash; or

(3) Personal lease bonds secured by negotiable U.S. bonds of a par value equal to the amount of the required surety bond, together with a power of attorney executed on a form approved by the Director.

(b) The applicant or bidder shall file the compliance bond in the proper office within 30 days of receiving notice. An original bond shall be furnished on a form provided by the Director.

(c) The period of liability for the compliance bond shall not be terminated until the lease account is in good standing.

(d) The bonding obligation for a new lease may be met by an adjustment to an existing bond covering another lease within the same logical mining unit.

§ 3472.4 Type of bond required.

(a) A compliance bond lease or license to mine, conditioned upon compliance with all provisions of the lease or license to mine except reclamation, shall be furnished in the amount determined by the authorized officer. The amount of the bond may be changed if the authorized officer considers such a change to be proper and necessary.

(b) A reclamation bond may be required in accordance with 30 CFR Part 742.

(c) For exploration licenses, a compliance bond must be furnished in accordance with § 3410.3-7 of this title.

§ 3474.3 Qualified sureties.

The authorized officer will notify those leaseholders who have nationwide or statewide bonds at the time of issuance of this subpart of the requirement to secure a separate compliance bond for each lease in the amount determined by the authorized officer to be proper and necessary. A list of companies holding certificates of authority from the Secretary of the Treasury under the Act of July 30, 1947 (6 U.S.C. 6-14) as acceptable sureties on Federal bonds is published annually in the FEDERAL REGISTER.

§ 3474.4 Default.

When the surety makes payment to the Government of any indebtedness due under a lease, the face amount of the surety bond and the surety's liability thereunder shall be reduced by the amount of such payment.

Subpart 3475—Lease Terms

§ 3475.1 Duration of leases.

Leases shall be issued for a period of 20 years and so long thereafter as the condition of continued operation is met. If the condition of continued operation is not met the lease will be cancelled as provided in § 3452.2 of this title.

§ 3475.2 Dating of leases.

(a) Leases will be dated and made effective the first day of the month following the date signed by the authorized officer. However, upon receipt of a prior written request, the authorized officer may date a lease to be effective on the first day of the month in which it is signed.

(b) Future interest leases shall become effective on the date of vesting of title to the minerals in the United States as stated in the lease.

§ 3475.3 Land description.

Compliance with § 3471.1 of this title is required.

§ 3475.4 Diligent development and continued operation.

(a) Each lease shall require (1) diligent development, and (2) either (i) continued operation except when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee, or (ii) in lieu thereof, when the Secretary determines that the public interest will be served, payment of an advance royalty as described in § 3473.3-2(b) of this title.

(b) For coal leases issued before August 4, 1976, the 10-year period for achieving diligent development may be increased as follows:

(1) Upon application by the lessee, the 10-year period shall be extended by an amount of time equal to the period during which diligent development is, in the opinion of the Secretary, significantly impaired by (i) a strike, the elements, or casualties not attributable to the lessee, (ii) an administrative delay in the Department which is not caused by the lessee's action, (iii) extraordinary circumstances not attributable to the lessee and not foreseeable by a reasonably prudent operator. In determining whether any of the conditions listed in subdivisions or (i), (ii), (iii) of this paragraph occurred and whether one or more of those conditions did, in fact, significantly impair diligent development, the Secretary's finding shall be final. The Secretary shall, however, not find to be an extraordinary circumstance under subdivision (iii) any condition arising out of normally foreseeable business risks such as: fluctuations in prices, sales, or costs, including foreseeable costs of compliance with requirements for environmental protection; commonly experienced delays in delivery of supplies or equipment; or inability to obtain sufficient sales.

(2) Upon application by the lessee, the Secretary may grant one extension, not exceeding five years, of the 10-year period because of (i) time needed to complete development of advanced technology, e.g., in situ, gasification or liquefaction processes; (ii) the magnitude of the project (ordinarily magnitude means a mine in which the production in the first year after the end of the extended period for diligent development is expected to be at least two million tons if an underground mining operation or five million tons if a surface mining operation); or (iii) a contract which is a firm commitment for the sale or use of the first one-fortieth of the LMU reserves after the 10-year period. Regardless of the reason for granting an extension, the lessee shall produce the first one-fortieth of the LMU reserves before the end of the extended term.

(c) At the time when the Secretary grants an extension under paragraphs (a) and (b) of this section, the lessee shall be notified of the revised date by which coal shall be produced in commercial quantities.

§ 3475.5 Logical mining unit.

(a) Criteria for approving or directing establishment of an LMU are found in 30 CFR 211.80. Each lease shall automatically be considered to constitute an LMU on the effective date of the lease or June 1, 1976, whichever is later. The lease LMU may, at a later date, by enlarged by the addition of other Federal leases or with interests in non-Federal coal deposits, or both. An LMU containing any interest other than a single Federal lease shall become effective only at the direction of the Mining Supervisor, or by designation during the normal tract delineation phase of the coal activity planning process, or upon its approval by the Mining Supervisor when requested by the lessee. The Mining Supervisor shall not direct or approve the establishment of such an LMU unless it is determined that the maximum economic recovery of all Federal coal deposits in the LMU will be achieved. The boundaries of an LMU may later be changed either upon application by the lessee and with the approval of the Mining Supervisor after consultation with the authorized officer, or by direction of the Mining Supervisor after consultation with the authorized officer.

(b) When a lease is included in an LMU with other Federal leases or with interests in non-Federal coal deposits, the terms and conditions of the lease shall be amended so that they are consistent with the requirements imposed on the LMU of which it has become a part. In particular, diligent development, continued operation, and production in commercial quantities anywhere within the LMU, with respect to either Federal or non-Federal coal deposits, shall be considered to have occurred on each Federal lease in the LMU. The rental and royalty payments of all Federal leases in an LMU shall be combined, and advance royalties paid on any Federal lease in that LMU may, at the request of the lessee, be credited against those combined royalties.

(c) The lessee may, upon approval of the authorized officer, surrender the rights to any coal deposits. If these rights are surrendered, the LMU reserves shall be adjusted. When the Mining Supervisor is determining the LMU reserves, the lessee shall be consulted about any coal deposits subject to the lease which the lessee does not intend to mine. The lessee shall also be consulted about the rights the lessee is prepared to surrender to decrease the LMU reserves upon which the requirements of diligent development, continued operation, and production in commercial quantities will be based.

GUY R. MARTIN,
Assistant Secretary of the Interior.

MARCH 13, 1979.

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APPENDIX B

MEMORANDA OF UNDERSTANDING

APPENDIX B

MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF THE INTERIOR AND THE DEPARTMENT OF ENERGY CONCERNING THE ESTABLISHMENT AND USE OF PRODUCTION GOALS FOR ENERGY RESOURCES ON FEDERAL LANDS

1. Purpose

The purpose of this Memorandum of Understanding between the Department of the Interior (DOI) and the Department of Energy (DOE) is to set forth concepts, assumptions, and responsibilities for the establishment and use of production goals for Federal energy leasing and to set forth mechanisms for implementing those responsibilities.

2. Concepts and Assumptions

a. The development of an integrated national energy policy by the Department of Energy requires the coordinated treatment of Federal resources as a constituent part of national energy planning consistent with overall national economic, environmental, and social goals and applicable law. These energy and resource development activities must be based on adequate data, rigorous analysis, and appropriate program decisions.

b. Each Department has responsibilities, authorities, information, and data which, when properly combined and executed, can produce efficient energy resource development in an environmentally acceptable manner.

c. The planning process must reflect the statutory responsibilities of each Department and the inherent uncertainty of forecasts as well as include public consultation, environmental considerations, and appropriate energy resource development.

d. Program goals should be reviewed on a regular basis.

e. Energy resources for purposes of this Memorandum include offshore oil, offshore natural gas, onshore oil, onshore natural gas, coal, oil shale, tar sands, geothermal resources, and uranium. Leases include leases of Federal lands (including Outer Continental Shelf (OCS) lands) or interests in such lands.

f. Projection periods for onshore and offshore oil and natural gas, coal, oil shale, and geothermal resources are 5, 10, and 15 years each; projection periods for tar sands and uranium will be specified in the individual information exchanges between the Departments on an *ad hoc* basis.

g. Production goals are the objectives for the national production of energy resources from Federal lands or interests in lands including the OCS which are necessary to carry out national energy policy and to enable each Department to fulfill its responsibilities under section 801 (b)(1) of the Department of Energy Organization Act.

3. Data Responsibilities of the Secretary of the Interior

a. The Secretary of the Interior will supply data and information (including supporting analyses and methodology) to the Secretary of Energy related to the extent of energy resources and current and anticipated production from the Federal lands, including OCS lands, or interests in such lands for the relevant projection period for each resource, consisting of:

(1) Estimated energy resources and estimates of anticipated annual production for the 5th, 10th and 15th projection years expected from leases currently under production and from leases expected to be developed, taking account of changes due to exhaustion of resources and abandonment of leases, under existing and proven technology and under existing laws and regulations. Where necessary, explanations of uncertainties as to estimates and data will be included; and

(2) Estimated energy resources underlying areas not currently under lease but which

are included in a leasing schedule or plan.

b. The Secretary of the Interior will also provide to the Secretary of Energy the following data and information, to the extent available:

(1) An evaluation of the energy resource potential of Federal lands neither currently under lease nor included in an established lease or schedule;

(2) Any other related data that may be requested by the Secretary of Energy in carrying out his pertinent statutory and regulatory duties.

4. Goal Setting Responsibilities of the Secretary of Energy

Subject to the process and timetable provided in Section 6:

a. The Secretary of Energy will develop proposed national energy production goals for Federal lands and, following review of those goals by the Secretary of the Interior, will establish final production goals.

b. The Secretary of Energy will propose and establish production goals for energy resources, on a resource by resource basis, on lands or interests in lands under Federal jurisdiction, for the relevant projection period, based upon the following.

(1) The production estimates provided by the Secretary of the Interior;

(2) Production estimates, developed by the Secretary of Energy, from Federal lands scheduled by the Secretary of the Interior to be leased;

(3) Increases or decreases in these estimates resulting from modification to pertinent regulations or statutes, anticipated advances in technology, or use of enhanced recovery methods; and

(4) Any additional increases or decreases in production which the Secretary of Energy may propose.

c. In setting these goals, the Secretary of Energy will take into account developmental lead times and will consider:

(1) The overall energy strategy set forth in the current or most recent Annual Report and National Energy Policy Plan prepared in accordance with sections 657 and title VIII of the Department of Energy Organization Act;

(2) The estimates, evaluations and other information provided by the Secretary of the Interior pursuant to section 3;

(3) Estimates, information, data and evaluations furnished by the Administrator of the Department of Energy's Energy Information Administration concerning, but not limited to, reserves and undiscovered resources;

(4) Such other considerations as the Secretary of Energy may deem pertinent; and

(5) With respect to coal, and as available and applicable for the other energy resources:

(a) The availability of the energy resource from private, State, Indian, and other non-Federal reserves already leased but not yet committed to production;

(b) The impact on potential production from non-Federal resources or on those Federal resources already leased but not yet committed to production, of leasing for production of additional Federal energy resources.

d. The Secretary of Energy will provide the Secretary of the Interior the assumptions and data used in developing the production goals.

e. The Secretary of Energy will include appropriate proposals on matters within his jurisdiction to adjust production, including, if applicable:

(1) Changes in regulations identified by section 302(b) of the Department of Energy Organization Act.

(2) Changes in procedures for setting production rates, or changes in the rates themselves; and

(3) In the Annual Report and National Energy Policy Plan required by section 657 and title VIII of the Department of Energy Organization Act, proposals for changes in legislation or other actions affecting the broad aspects of energy policy for which the Department of Energy has responsibility.

5.

In reviewing and commenting on the Secretary of Energy's proposed production goals, the Secretary of the Interior will inform the Secretary of

Energy of potential policy conflicts or problems concerning, but not limited to:

a. The Department of the Interior's responsibilities for the management, regulation, and conservation of natural resources;

b. The capabilities of the Federal lands and Federal energy resources to meet these goals;

c. The national need for these energy resources balanced against the environmental consequences of developing them.

6. Process and Timetable

a. As soon as practicable after the effective date of this Memorandum the Secretary of the Interior will provide the Secretary of Energy the information, data, and assessments pursuant to section 3.

b. Within 30 days after receipt of the Secretary of the Interior's information, data, and assessments regarding a particular energy resource, the Secretary of Energy shall advise the Secretary of the Interior of the time schedule for his preparation of proposed production goals. Such production goals shall be transmitted to the Secretary of the Interior as soon as practicable after receipt by the Secretary of Energy of the above mentioned information.

c. The Secretary of the Interior will have 60 days to review and comment on the proposed production goals.

d. The Secretary of Energy will issue final production goals not more than 30 days after the Secretary of the Interior's comments have been received.

e. This process will be repeated biennially from the effective date of this Memorandum or at such other interval as the Secretaries may agree.

f. The final production goals will be published in the current or next Annual Report or National Energy Policy Plan of the Secretary of Energy under section 657 and title VIII of the Department of Energy Organization Act.

g. In establishing or revising leasing programs and lease planning schedules, the Secretary of the Interior shall be guided by the final production goals established pursuant to this Memorandum consistent with the Secretary's other statutory responsibilities.

7. Coordination

Coordination of these procedures *may be* accomplished through the Leasing Liaison Committee established in accordance with section 210 of the Department of Energy Organization Act.

8. Effective Date

This Memorandum shall be effective upon execution.

S/James R. Schlesinger
Secretary of Energy

9/9/78
(Date)

S/Cecil D. Andrus
Secretary of the Interior

8/31/78
(Date)

MEMORANDUM OF UNDERSTANDING BETWEEN THE BUREAU OF LAND MANAGEMENT AND THE FISH AND WILDLIFE SERVICE ON COAL

I. PURPOSE

The purpose of this agreement is for the Bureau of Land Management (BLM) and the Fish and Wildlife Service (FWS) to assure the effective consideration of fish and wildlife resources in coal related activities on public lands in a manner that recognizes existing cooperative relationships with the States. It is also to promote harmonious working relationships and program efficiency in the public interest.

A. Responsibilities

The key to achieving the purpose of this agreement is clear definition of BLM and FWS roles and responsibilities within respective statutory authorities. Broad responsibilities are defined below. Specific responsibilities and relationships are set forth in section II of this agreement.

1. The BLM has the statutory responsibility for inventory, planning, and multiple-use management of the public lands and public land resources, including coal and fish and wildlife. In connection with this responsibility, BLM must have the capability to efficiently inventory, manage and protect fish and wildlife habitat.
2. FWS has statutory responsibilities for protection of migratory birds, including eagles, and threatened or endangered species and their habitats. The Fish and Wildlife Coordination Act responsibilities of FWS extend to some water development projects on public lands.
3. FWS and BLM have general responsibilities to conduct research and to compile information on the status of the fish, wildlife and plant resources and those factors affecting them in their respective area of responsibility. These general assessments for wildlife and vegetative conditions and trends extend to concerns within major coal regions.
4. Both Agencies have wildlife advocacy roles within their statutory authorities or other assigned functions.

B. General Principles

1. The cooperative relationship between the two Agencies is built upon the concept that field level input into the BLM land use planning system will achieve the basic objectives of each Agency, and the Department of the Interior (DOI). The BLM has a statutory responsibility to see that fish and wildlife resources are effectively considered in all stages of its land management programs and activities. Procedures consistent with this MOU will be established by BLM State Directors and FWS Regional Directors to provide for regular exchange of information and advice as early as feasible in the BLM planning process. FWS input will reflect BLM's responsibility of the need to balance wildlife interests with other concerns in coal development and multiple-purpose land management. In those cases where there are disagreements, such disagreements should be expressed through the chain of command of the two Agencies beginning at the lowest appropriate field level.
2. BLM has responsibility for assuring the collection, inventory, and subsequent analysis of fish, wildlife and vegetative data on the public lands. FWS also has responsibilities for collection and analysis of data to meet its requirements. FWS concerns in this area relate to the adequacy of the data and analysis as these relate to responsibilities of FWS relative to endangered species, migratory birds, and other species. FWS is also concerned with the general adequacy of data and analysis for management and protection of wildlife, wildlife habitat, and threatened and

endangered plant species on a national and regional basis. These responsibilities and concerns can best be met by FWS participation in appropriate components of the planning system as identified in subsequent sections of this MOU. Both Agencies will coordinate inventory system development and applicable data gathering activities to foster a common and compatible resource data base, to share information, and to minimize conflicts and disagreements concerning adequacy of wildlife data related to coal development decisions from the outset. BLM will seek FWS participation in the actual conduct of data collection activities to meet its requirements where such participation is mutually advantageous. In turn, FWS will seek BLM participation in data collection and analysis to meet its requirements where it is appropriate.

3. The BLM State Offices and the FWS Regional Offices or their delegated Offices will be the primary Offices through which field coordination will take place. Each is responsible for ensuring that appropriate Offices of their organization are involved whenever appropriate. On matters pertaining to coal related field studies or investigations, the FWS Regional Director or the BLM State Director will determine which items of mutual interest are administered by their respective Office and which items should be referred to other field organizational units (i.e., BLM Denver Service Center, FWS Research Centers and National Teams). Upon referral, the Directors or Leaders of the field unit will be the coordination focal point for that activity or activities within the respective Bureaus. Additionally, the Directors or Leaders of these field units will apprise FWS Regional Directors and BLM State Directors of planned or ongoing coal related studies, projects, and activities. Frequent informal consultation on matters of mutual concern is to be encouraged at all levels.
4. BLM State Directors and FWS Regional Directors will keep each other apprised of actions planned or taken with State wildlife agencies on wildlife matters of concern in coal areas. Whenever coal-related research actions and nonoperational studies are proposed with State wildlife agencies by field units within BLM and FWS that are not administered by the FWS Regional Director or BLM State Director, it shall be the responsibility of the Director or Leader of that field unit to keep both the Regional and State Director informed. BLM will ensure State wildlife agency involvement in the coal programs. Officials of both Agencies will also keep each other informed of their respective activities relating to coal resources on public lands.
5. FWS will otherwise assist BLM in a manner consistent with this MOU, through cooperative procedures mutually agreed by BLM State Directors and FWS Regional Directors, or as appropriate, Directors or Leaders of other BLM or FWS field units. Some examples include participation in certain field projects, providing highly specialized expertise, developing methodologies for data collection and interpretation and assessing major impacts on wildlife for preventing or mitigating damage to important habitats, and conducting and sharing research findings to support BLM identified needs.

C. General Coordination

1. *Meetings.* There shall be annual coordination meetings between State and District BLM Offices and appropriate FWS Regional and Area Offices, and such other Offices as deemed appropriate, timed to coincide with the budget cycle, to discuss programs and plans relative to coal and other items of mutual concern to both Agencies. WO level meetings shall be held by the BLM/FWS Coordinating Committee.
2. *Written Communication.* When FWS advice/recommendations are solicited on subjects related to this agreement, the FWS will be afforded 30 days unless specified otherwise in which to make its views known to BLM to the extent time deadlines imposed on BLM permit. If no

response is received within the 30 days or other specified time period, BLM will assume that FWS either concurs or has no comments to offer.

3. *Supplemental Agreements.* BLM and FWS field organizations or other appropriate organizational units may enter into supplemental agreements where needed to specify interrelationships in detail or for specific project type activities. Such agreements must be within the policy parameters of this agreement. Both BLM State Directors and FWS Regional Directors will make every effort to ensure coordination is achieved at their lowest appropriate field units. Where mutually agreeable, BLM State Directors and FWS Regional Directors will delegate coordination functions to their field units.

II. FUNCTIONAL COORDINATION

This section outlines Agency responsibilities and working relationships by functional area.

A. Preleasing

1. Subject: Resource Inventories

   a. *Description:* Inventories must be conducted to determine the nature and extent of living and nonliving resources; to provide a basis for land use planning and decisionmaking; and to identify the nature, extent, and condition of all resources located in planning areas with potential for coal development.

   b. *Responsibilities:* The Federal Land Policy and Management Act (FLPMA) directs BLM to maintain resource inventories on a continuing basis. FWS has legislative responsibilities to conduct nationwide inventories related to migratory birds, wetlands, and threatened and endangered species. Both Agencies may also be assigned responsibilities for inventory via Presidential or Departmental direction. BLM has responsibility for inventory work relative to data necessary for public land management. This includes inventory and planning responsibilities for threatened and endangered species on public lands in coal areas pursuant to regulations regarding Section 7 of the Endangered Species Act (ESA). FWS will provide support in terms of cooperative development of new methodology and inventory techniques and supply applicable data to BLM. FWS Regional Directors and BLM State Directors will take steps to ensure that appropriate organizational units, e.g., FWS Area Offices and BLM District Offices will periodically coordinate their activities and capabilities. Joint efforts in this regard will be guided by the Interagency Agreement Relative to Classification and Inventory of Natural Resources, effective June 6, 1978. In accordance with that agreement, both Agencies will work in partnership to ensure that needed data are obtained in a cost effective and expedient manner.

The BLM's planning system contains several inventory steps applicable to coal activities. These steps, including their overall purposes, are outlined together with the nature of specific FWS inputs at the field or BLM planning unit levels:

Step	BLM Responsibility	FWS Input(s)
1. Preplanning Analysis	Determine wildlife resource data needs; develop planning/ inventory schedule for wildlife resources; estimate financial requirements.	Help identify general wildlife situations in coal areas, and recommend data elements needed to address wildlife issues.
2. Unit Resource Analyses (URA)	Identification of existing wildlife resource conditions and potentials on planning area basis.	Help identify known significant wildlife habitats (existing and potential) and provide other assistance, technical support, and advice.

2. Subject: Land Use Planning

   a. *Description:* Land plans must be developed as a requisite for management and decisionmaking regarding allocation and use of resources located on public lands, in accordance with planning mandates in the FLPMA, the Federal Coal Leasing Amendment Act of 1975, and the Secretary's decision of October 22, 1977, which calls for plans prior to identification of lease tracts. In BLM, such plans are

called management framework plans (MFP's).

b. *Responsibility:* The FLPMA directs development, with public involvement, of BLM land use plans which provide, by tracts or areas, for the use of the public lands. Such plans must address: multiple-use and sustained-yield, areas of critical environmental concern (ACEC), interdisciplinary concerns, present and potential uses for wildlife and other resources, and certain other requirements. To the extent consistent with law, these plans must be coordinated with land use inventory and management programs of other Federal Agencies and State and local governments. Therefore, FWS will provide comment on URA's/MFP's in potential coal production areas by participating in a consultative manner to minimize conflicts and disagreements. Such comments will be considered and incorporated, as deemed appropriate, into decisionmaking by BLM District Managers, as well as comments from other Federal and state agencies and private organizations.

3. Subject: Identification of Areas to be Excluded From Leasing and Lands Unsuitable for Mining

a. *Description:* Certain areas that may be excluded from leasing or identified as unsuitable for mining because of: (1) statutes or (2) policy determinations such as for high socioeconomic or ecological values associated with wildlife, archaeology, cultural and other resources, and (3) for reasons of public health and safety.

b. *Responsibility:* The FLPMA directs that critical environmental areas be identified during BLM land use planning. The Federal Coal Leasing Amendments Act requires planning prior to coal leasing. Also, the interagency agreement between BLM, Geological Survey (U.S.G.S.), and the Office of Surface Mining Reclamation and Enforcement (OSM), approved July 1978, delineates Agency responsibilities for identification of "areas unsuitable for mining" as directed by the Surface Mining Control and Reclamation Act (SMCRA). In accordance with these authorities and relationships, BLM must decide which areas of public lands are of environmental concern and, thus, may be unsuitable for mining or excluded from leasing.

The Department is providing BLM with criteria relative to land suitability for leasing. Such criteria will serve as a basis for unsuitability designations or excluding lands from leasing. Within the parameters of Departmental criteria, FWS may provide to BLM information which it feels should be considered in making these designations during the land use planning process.

4. Subject: Tract Selection

a. *Description:* This involves identification and selection of specific tracts for short and long term leasing, preference right leasing, and land use decisions by BLM District Managers. Selection of such tracts will be after decisions are reached on areas unsuitable for mining, or excluded from leasing.

b. *Responsibilities:* BLM is responsible for selection of tracts suitable for leasing after decisions are made as to "areas unsuitable for mining." Using information available through the land use planning process and from specific recommendations from FWS, States, and others, tracts will be selected, then ranked for priority of leasing. Thus, through participation in the planning and tract selection process, FWS will have opportunity to provide information and opinions in the tract decision process.

5. Subject: Lease Stipulations, Terms, and Conditions

a. *Description:* This involves preparing special terms regarding environmental performance standards and other protective provisions in coal related leases.

b. *Responsibility:* The FLPMA directs that all actions necessary be taken to prevent unnecessary or undue degradation of the public lands. BLM is the official representative of the Secretary in dealing with lease applicants and, as such, is responsible for placing protective provisions and stipulations on coal leases.

Such stipulations and provisions are developed and based upon decisions flowing from the MFP,

upon findings in environmental impact analysis, and the technical examination.

BLM is responsible for incorporating stipulations and conditions into leases after consideration of all recommendations, including those from FWS. FWS recommendations or suggested modifications will be solicited for appropriate analysis in coal lease stipulations.

6. Subject: Environmental Analysis
   a. *Description:* This involves preparation of regional or, when warranted, site specific prelease environmental analysis reports (EAR) or environmental statements (ES) concerning lease tract selections.
   b. *Responsibilities:* Sec. 102(2)(c) of the National Environmental Policy Act (NEPA) requires agencies taking major Federal actions significantly affecting the quality of the human environment to prepare ES's on those actions. Extraction or mining of coal and related activities, such as issuance of rights-of-way and water developments to support such industrial activities are also among the actions to be considered. Present "lead agency" responsibilities for preparation of such analyses rest with BLM except in special exceptions where another agency may be designated as lead agency. These responsibilities must be carried out in consultation with all appropriate agencies and organizations, including the FWS. The following procedures are hereby established to ensure close working relationships between the two Agencies in this regard:

(1) BLM will keep FWS apprised of current and projected ES schedules via the regularly scheduled meetings of the FWS-BLM Coordinating Committee and other means, as appropriate.

(2) BLM will request FWS data and other inputs into the applicable ES's at the earliest possible date. Where FWS has special expertise or unique talent needed for the ES, such will be made available to the BLM ES team under terms and conditions mutually agreeable to the concerned FWS Regional Director and BLM State Director. This may include detail of FWS personnel to assist in ES preparation.

(3) FWS and BLM budget requests for ES's and associated work will be coordinated to reflect their respective responsibilities in the most cost-effective approach and to foster clear communications between the two Agencies. The FWS-BLM Coordinating Committee will be the principal vehicle for ensuring such coordination at the Washington Office (WO) level. Coordination at the field level will be in accordance with procedures agreed to by FWS Regional Directors and BLM State Directors.

(4) BLM will provide FWS review copies of draft ES's at the earliest possible time for official review and comment within specified time frames.

7. Subject: Endangered Species Consultation
   a. *Description:* BLM must consult with FWS on any action which may affect threatened or endangered species or their habitats.
   b. *Responsibilities:* Whenever it is found that threatened or endangered species or their habitat may be affected by coal leasing or mining activities, the concerned BLM State Director must initiate written formal consultation in accordance with Interagency Cooperation Regulations dated January 4, 1978. To the extent that the concerned BLM State Director and the FWS Regional Director can agree, and as provided for in the above regulations, an aggregate approach to consultation in coal areas will be followed. Whenever FWS rules that additional data are needed upon which to issue a biological opinion, such data must be provided by BLM before the consultation process can be concluded. It is jointly agreed that not all habitat modifications are prohibited, only those which diminish habitat for the species in question. The FWS will provide methodology, expertise and recommendations, upon request, to help resolve operational problems caused by endangered species in coal areas.

B. Post Leasing

1. Subject: Compliance With Lease Stipulations
   a. *Description:* This involves monitoring exploration and associated activities to ensure compliance with lease stipulations and/or special terms and conditions.
   b. *Responsibilities:* BLM is responsible for ensuring that lessees abide by lease terms

and conditions. Where in the course of other activities, FWS personnel find or become aware that a lessee is not in compliance with lease terms or conditions, such personnel should immediately advise the nearest BLM Office. The BLM will then take necessary action.

2. Subject: Emergency Environmental Situations
   a. *Description:* Some situations may arise in leased areas that involve either imminent danger to public health or safety or where conditions, practices, or violations of regulations or lease terms are causing or may cause significant, imminent environmental harm to land, air or water, or other resources or significant waste of coal. In such cases, it may be necessary to order cessation of such activities or violations and to order immediate remedial action.
   b. *Responsibility:* The BLM has such authority when authorized mine inspectors are unable to take action before significant harm or damage will occur. If in the course of other activities FWS personnel become aware that such conditions exist, the appropriate BLM State Director and/or District Manager is to be so informed immediately and will take appropriate action to resolve the situation.
3. Subject: Review of Reclamation Plans and Abandonment Procedures
   a. *Description:* Lessees must prepare adequate plans for reclaiming mined areas which meet the reclamation requirements of the SMCRA and multiple-use management requirements of FLPMA.
   b. *Responsibilities:* The OSM has primary Federal authority to inspect and approve abandonment procedures. BLM must concur in such abandonment procedures as related to protection and postmining use of the lands regarding fish, wildlife and other natural resources. BLM resource staffs will analyze the adequacy of such procedures. Where such procedures are found to be inadequate, BLM will suggest needed changes and improvements. FWS will be afforded an opportunity to provide comments to BLM as to the adequacy of proposed procedures prior to BLM concurrence, in accordance with procedures agreed to by appropriate BLM and FWS field officials. BLM will notify/negotiate/ resolve with applicable agencies and groups, including FWS, any issues which would serve as grounds for BLM nonconcurrence.

III. RESEARCH AND DEVELOPMENT

Annual meetings shall be held at the field and WO levels to coordinate research surveys, investigations, and studies being conducted that are of mutual program interest to both Agencies. This includes such work being conducted by the FWS WELUT and the EELUT, cooperative research units, or other applicable entities of FWS and BLM's Denver Service Center. Such meetings shall be initiated, scheduled, and organized by mutual agreement of appropriate officials of both Agencies. Agenda items should provide for discussion/resolution of Agency needs and priorities relative to coal activities and associated wildlife considerations.

When it is of mutual interest, the FWS and the BLM may conduct cooperative research in coal areas.

Each Agency will be given an opportunity to identify and review research proposals relating directly to its lands or management responsibilities developed by the other for the purpose of avoiding duplication and to determine if similar research is being conducted by other agencies. Pertinent research results of either Agency will be made available to the other on a timely basis, including significant interim findings. The FWS will provide a periodic report summarizing wildlife research pertinent to coal.

IV. INFORMATION TRANSFER

It is recognized that a wide variety of biological, ecological, and scientific information, published and unpublished, exists within both Agencies. This includes information and data relating to resource conditions and trends, wildlife and habitat inventories and baseline studies, economic or other values, demand/supply, and use statistics. Free exchange of this information in compatible and standardized formats is essential.

It is, therefore, mutually agreed that procedures will be developed under the direction of the national BLM/FWS Coordinating Committee for

more formalized transfer of information between BLM and the FWS at all levels.

V. PERMITS REGARDING WORK IN NAVIGABLE WATERS

The Secretary of the Interior has delegated to the FWS Director and Regional Directors authority to act for the Department in the review of and reporting on permit applications administered by the USA-CE (503 DM 1, August 3, 1973). Procedures and necessary evaluations of permit application for coal operations on public lands, as required under secs. 402 and 404 of the Federal Water Pollution Control Act and by the Rivers and Harbors Act of 1899, shall be coordinated at the FWS Area Office and BLM District Office or other appropriate level before a formal application is made to the U.S. Corps of Engineers.

VI. RELATIONSHIPS TO STATE, OTHER AGENCIES, AND INSTITUTIONS

Nothing in this MOU is intended to modify in any manner the present or future cooperative programs of either Agency with States, other public agencies, or educational institutions. Both Agencies share the concern that State fish and wildlife resource agencies be consulted on a routine basis to strengthen coordination and cooperative relationships. Every effort will be made to prevent duplicative requests or contracts to these State agencies for information and data assistance relative to coal.

VII. OBLIGATION OF FUNDS

Nothing in this agreement shall be construed as obligating either party to the expenditure of funds in excess of appropriations authorized by law or otherwise commit either Agency to actions for which it lacks statutory authority.

VIII. EFFECTIVE DATE, REVIEW, AMENDMENT, AND TERMINATION

This agreement shall become effective upon the date subscribed by the last signatory, and shall remain in force until terminated by either Agency upon 90 days written notice. It shall be reviewed by all parties no later than Calendar Year 1981 for adequacy and timeliness. Amendments to existing wording within this agreement may be proposed by either Agency at any time and shall become effective upon joint approval.

IX. BUDGET COORDINATION

To insure maximum compatibility of budgetary requests and the subsequent distribution and utilization of funds, the following coordinating functions shall apply:

A. *Joint Review of Budget Materials*

1. Prior to formulating coal related budget instructions, the BLM and FWS shall jointly review the coal program to determine program objectives and budget assumptions.
2. Each Agency shall provide the other an opportunity to review budgetary material relating to all activities on behalf of coal leasing and coal development. Where coal related work is supported by a number of activities, these will be identified to facilitate review of budgetary plans.
3. To the extent possible, review opportunity shall be given sufficiently in advance of budgetary due dates to permit meaningful input and discussion before such budget material must be finalized.
4. Neither Agency shall advance a program which is directly linked or referenced to the activities, actions, or authorities of the other Agency without advance consultation and mutual understanding as to the nature of that program and actions to be undertaken within the scope of this agreement.
5. Budget materials as used herein apply to Departmental Program Strategy Papers, Office of Management and Budget (OMB) Estimates, Budget Justifications for Congressional review, and any amendments or supplementals thereto.

B. *Budget Year Consultation*

1. Where the budget (or appropriations act) for the upcoming fiscal year (FY) in one Agency contains funds or positions earmarked for direct transfer to other Agency, such funds and positions shall be identified in writing prior to the start of the FY for budget planning.
2. Where funds and manpower are to be retained in the Agency, but are to be committed toward those efforts related to coal leasing and coal development, each Agency shall, to the extent known, inform the other as to the approximate level of

direct funding, its distribution, and expected accomplishments for the upcoming FY. Each Agency's plans shall be communicated to respective field offices to facilitate further coordination at the State-Regional level.

3. Funds earmarked for cooperative research shall be identified and transferred to the Agency designated as "lead Agency" for the research project.

C. *Coordinatiion Points*

Coordination activities, as described in this section, shall be the primary responsibility of:

For BLM - Chief, Division of Budget and Program Development and For FWS - Assistant Director - Planning and Budget

X. CONFLICT RESOLUTION

Should interagency controversy arise at any working level, the facts regarding such controversy shall be forwarded to the next higher level of authority for resolution.

9/26/78
Date

S/Frank Gregg
Director, Bureau of Land Management

9/26/78
Date

S/Lynn A. Greenwalt
Director, Fish and Wildlife Service

I CONCUR:

S/Guy R. Martin
Assistant Secretary, Land and Water Resources

10/2/78
Date

S/Robert L. Herbst
Assistant Secretary for Fish and Wildlife and Parks

10/3/78
Date

APPENDIX C

COAL TECHNOLOGY BACKGROUND INFORMATION

APPENDIX C

COAL TECHNOLOGY BACKGROUND INFORMATION

C.1 IMPORTANT COAL CHARACTERISTICS

Coal is a readily combustible mineral containing more than 50 percent by weight and more than 70 percent by volume carbonaceous materials, including inherent moisture formed from compaction and induration of variously altered plant remains similar to those in peat [1]. Character and quality (as defined by rank and grade) are the factors that determine the relative value and usefulness of coal. These factors are controlled principally by conditions during formation and the depth of burial of the coal.

Coal is classified according to a particular property such as degree of metamorphism or "coalification" (rank), constituent plant materials (type), or degree of impurity (grade). The rank of a particular coal is established according to the percentage of fixed carbon and the peat content, calculated on a mineral-matter-free basis. As shown in Figure C-1, the percentage of fixed carbon and the heat content (measured in British thermal units, Btus) increases from low rank lignite to higher rank bituminous coal as the percentages of volatile matter and moisture decrease. Coal is classified by grade largely according to the content of ash, sulfur, and other constituents.

C.2 MINING TECHNOLOGY

Exploration, development, production, and reclamation are the four operations executed during the life of a coal mine. These operations are described in the following sections.

C.2.1 Exploration

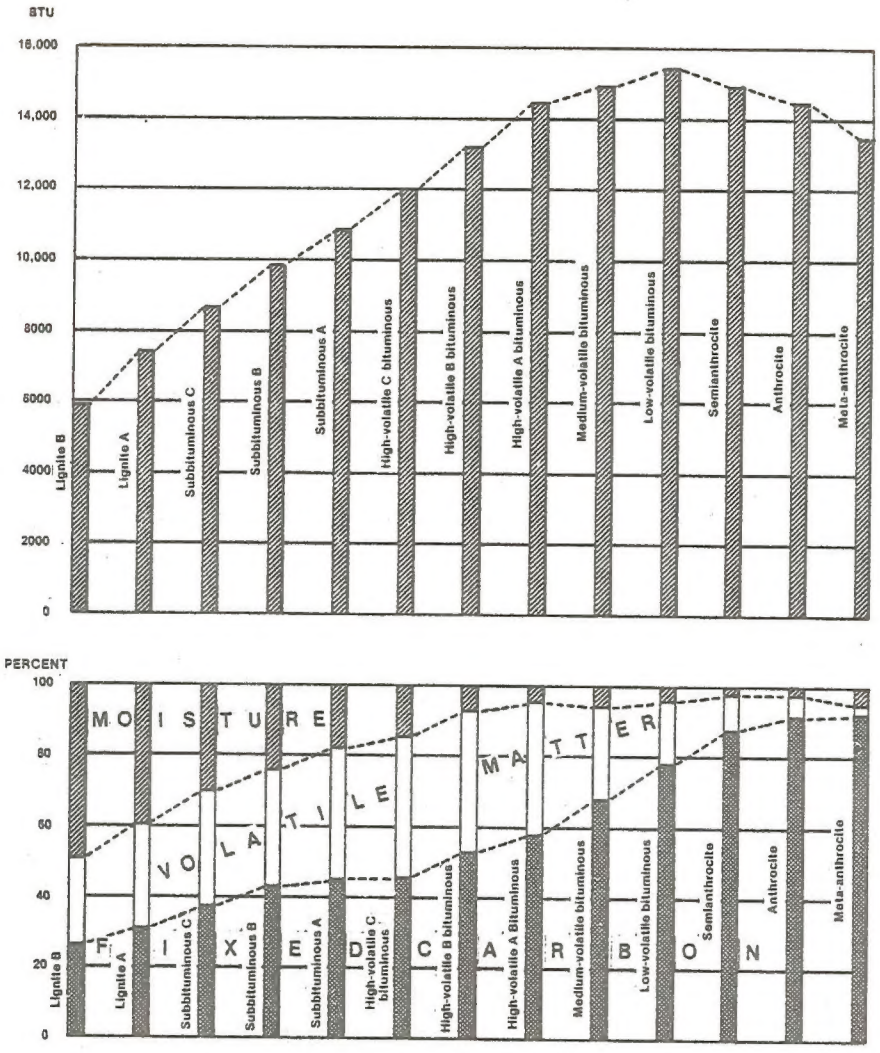
Generally, exploration aims at locating the presence of economic deposits and establishing their nature, shape and grade. There are three broad phases which comprise mineral exploration–initial appraisal, preliminary reconnaissance, and detailed physical sampling [3].

C.2.1.1 Initial Appraisal. This step involves literature search and the review of maps (geological, geographical, hydrological, etc.) to ascertain factors relating to surface and mineral ownership, access routes, seam thickness, seam pitch, surface contours, overburden thickness and composition, the presence of other minerals, as well as surface and groundwater flows.

C.2.1.2 Preliminary Reconnaissance. If the initial appraisal looks promising, a preliminary field visit is made to check surface hydrology, the location of coal outcrops, and unusual obstacles such as areas of archeological or cultural interest. A series of spot or information drillings may be made for better determination or stratigraphy and coal seam thickness. Chemical and calorific checks of outcrops and/or drilling samples are also made.

C.2.1.3 Detailed Physical Sampling. As the expectation for profitably extracting coal increases, more drillings are made to verify physical and chemical characteristics and map the coal seam. A set of outline drillings are made to ascertain the dimensions of the deposit and amount of reserves. These may then be followed by sampling drillings to determine the necessary parameters with enough certainty that reliable economic appraisals are possible. In general, coal deposits require less drilling than other minerals because coal is fairly consistent in thickness and quality and wider spacing can be tolerated between exploratory holes. In some instances, drilling on 1/4 mile centers is satisfactory; this is unique in mineral extraction programs since 200-foot centers are usually required. Besides the mineralogical, chemical and physical testing of drill core samples and outcrop cuttings, there are several types of downhole or bore hole tests which can be made with instruments lowered into the drill hole. These experiments involve devices making seismic, gravimetric, magnetic, and electrical resistance readings of the different underground strata.

Exploratory drilling is generally done with truck-mounted rotary rigs, and the samples taken with such rigs can be either cuttings or core, or



Source: Reference Number 2.

FIGURE C-1

COAL CLASSIFICATION BY RANK

both. Additional equipment used by an exploration crew may include water trucks, personnel carriers, a hole-logging equipment truck, and a dozer or grader to assist in obtaining access to the exploration area and to prepare the drill site.

C.2.2 Mine Development

Development, the operation preparatory to production, begins after a promising coal deposit has been found. Actual development cannot begin until all necessary arrangements have been made with Federal, state and local governments, as well as any private owners that may be involved. Such arrangements include obtaining a lease; providing access to the mine property for roadways, railroad, utilities; and obtaining the permits and licenses required by Federal, state, and local authorities. A usual requirement is that a mining and reclamation plan be approved before a permit is granted. Bond is posted to insure payment of rents, royalties, and land reclamation costs as mining progresses.

Planning, the first stage of development, involves specifying how the development work is to be accomplished, the method and equipment to be used for mining, the design of above-ground facilities, the plan for prevention of air and water pollution, and the provisions for reclaiming disturbed land.

After planning, the development of a mine includes construction of roads, utility line tie-ins, and the mine plant. Depending on the amount of coal produced and where it is to be used, construction of a railroad spur may be required. For coal that contains excessive impurities, a washing plant could be constructed as part of the mine plant. Otherwise, the mine plant consists of coal handling and storage facilities, offices, shops and laboratories, equipment storage buildings, and waste disposal areas. If the coal is to be mined by underground methods, the mine plant is constructed near the main portal or entrance. For coal mined by surface methods, the mine plant would be located off the outcrop, if possible.

Access to coal deposits at an underground operation is provided by drifts, slopes, or shafts (Figure C-2). The coalbed is developed for further operations by driving entries. Although terminology varies, the following system of entries is universal in the industry. Main entries are extensions of the access openings and often run several miles in one direction. Three or more parallel entries, 12 to 22 ft. wide and 40 to 100 ft. between centers, are driven in a given direction and connected at intervals by crosscuts to provide proper air circulation. These are the major routes of underground transport and access, and serve for the life of the mine [1]. Panel entries are driven from the main entries, resulting in a subdivision of the coalbed into blocks or panels having dimensions that may be as much as 1 by 1/2 mile. Panel entries serve as routes from main entries to the working places, and for air circulation. Although coal is removed during the driving of both the main and panel entries, it is with completion of the panel entries that the production cycle begins.

Access to coal deposits at a surface operation involves the use of large equipment such as bucket-wheel excavators, draglines and shovels to remove overburden from the coal so extraction can begin. As mining progresses, development mainly consists of extending paved roads and power lines, and constructing new roads for access to the coal deposit.

C.2.3 Coal Production

This section addresses the primary operations of extracting the coal from a deposit and preparing (cleaning and purifying) it for shipment and use.

C.2.3.1 Extraction. There are two major methods of extracting coal: by underground mining methods or surface mining methods. Associated with each method are a number of alternatives.

Underground Mining. In underground mining, after the initial development has gained access to the coalbed, one of three methods, i.e., room-and-pillar, longwall, and shortwall, is commonly used to extract the coal.

Room-and-pillar mining has been used in the United States longer than any other underground method. Mining is accomplished by driving entries off the panel entries. As mining advances, rooms are excavated in the coal seam; the strata above the seam are supported by pillars of coal left in place. After a block panel or section has been mined, part of the coal in the pillars can be recovered as a retreat is made toward a main entry (Figure C-3). Until about 1950, most of the coal produced from underground mines was by this conventional technique. Since then, conventional mining gradually has been replaced by more mechanized, continuous mining. Conventional

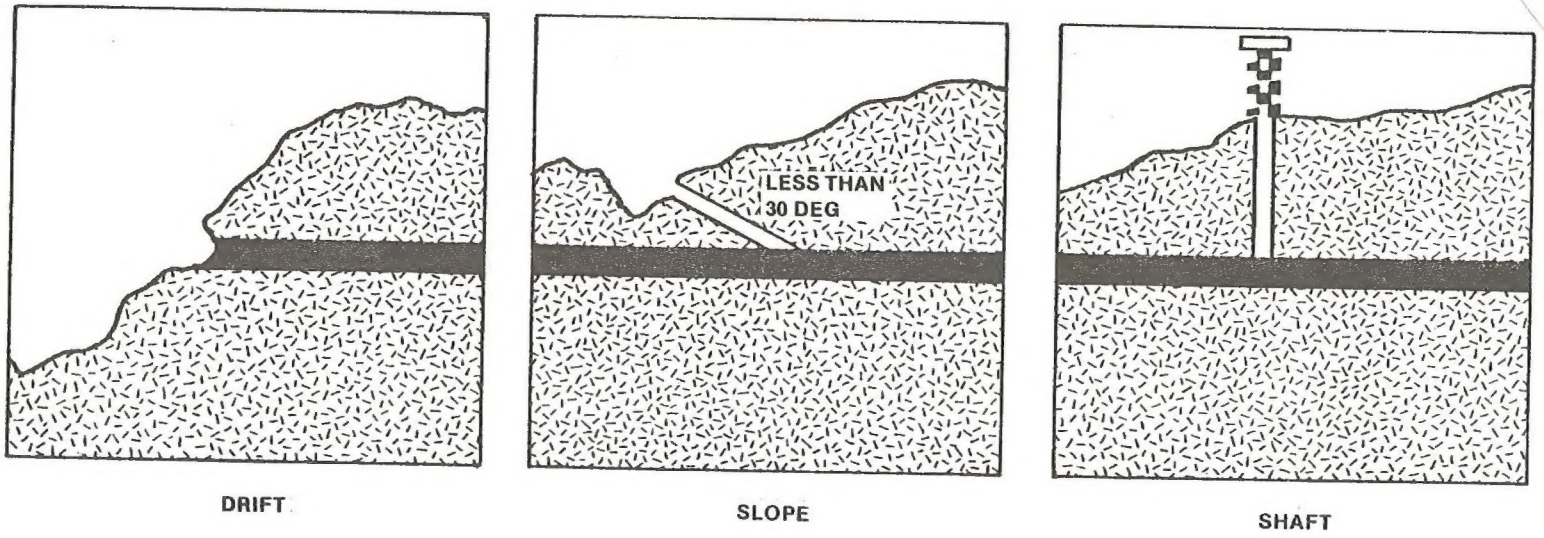


FIGURE C-2

THE THREE TYPES OF ACCESS USED
IN UNDERGROUND COAL MINES

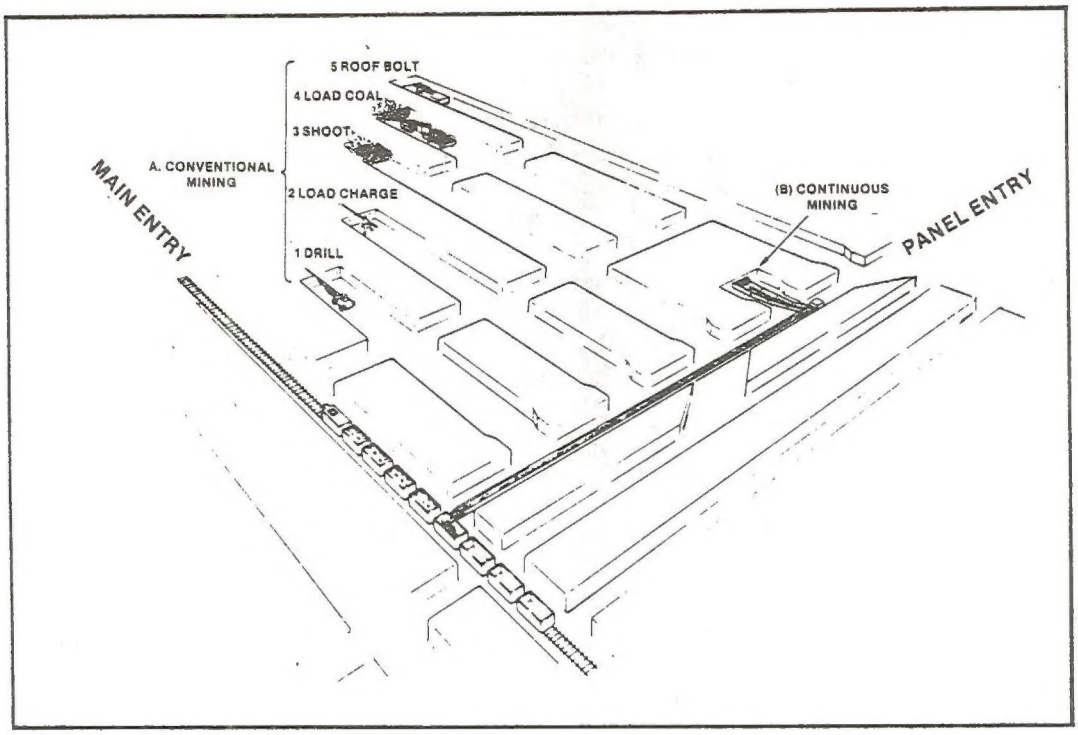


FIGURE C-3

ROOM-AND-PILLAR MINING TECHNIQUES

mining requires driving a number of entries so that each operational phase, i.e., undercutting, drilling, placing explosives, blasting, loading the shot coal, and roof bolting, can be done simultaneously. Continuous mining is performed by electric-powered machines that either bore, dig, or rip the coal from the working face. As shown in Figure C-3, many of the operations performed in separate panels with the conventional technique are performed simultaneously in the same panel with the continuous technique. Such machines are usually crawler-type vehicles operated by one man. They either load the coal directly into a shuttle car or pile it behind the machine where it is loaded separately onto the shuttle cars. True continuous operation of a mining machine cannot be achieved, however, because stops are required to support the roof, await haulage equipment, advance power and water supplies, change cutting bits, etc. Where the entire thickness of a coal seam is to be mined, recovery averages about 50 percent. However, it is not always possible to take all the coal in the seam because it may be necessary to leave part of it for roof support. This is common practice in seams greater than 10 feet in thickness. Roof bolts and timber are used for additional support.

Contemporary longwall mining, first introduced to the United States in the 1950s, has long been practiced in European mines. To support the roof at the face, longwall mining originally used manually operated props, then gradually evolved to the presently used powered, self-advancing supports (Figure C-4). Longwall mining is used most efficiently in uniform coal seams of medium height (42 to 60 in.). As in the room-and-pillar method, longwall mining starts with sets of entries cut into the panel areas. The difference in the technique lies in the distance between these sets of entries and the method used to extract intervening coal. Longwall blocks range from 300 to 600 ft. wide and are sometimes a mile long. The longwall machine laterally shears or plows coal from the entire face, transports the fallen coal by an advancing conveyor to a secondary haulage conveyor, reverses direction at the end of a cut, and supports the roof in the area of the face by a self-advancing system of hydraulic jacks. The roof is allowed to cave behind the advancing work areas; the roof is occasionally blasted to ensure a controlled cave-in rate and to reduce overburden pressure on the coalbed being mined.

The shortwall method of mining coal, a relatively new innovation, is best described as a method similar to longwall mining with two exceptions. The blocks of panels are smaller, usually ranging from 100 to 150 ft. wide and 300 to 500 ft. long, and the coal is cut with a continuous miner and is loaded into shuttle cars.

Surface Mining. Strip and auger mining are the two most common surface methods of extracting coal in the United States. Two other methods, open-pit and quarry-type mining, are being tried in thick, shallow-lying western coal seams and may become generally accepted where conditions warrant their use.

Strip mining is accomplished by two techniques, area stripping and contour stripping (Figures C-5 and C-6). Where coalbeds are relatively flat and near the surface, as in much of the west, area stripping is the dominant technique [4]. In area strip mining, overlying material is removed from a seam of coal in long narrow parallel bands, or strips, followed by removal of the exposed coal. With the exception of the first cut (box cut), overburden from each cut is discarded in the previous cut from which the coal has been removed. These parallel cuts continue across the coal seam until the thickness of the overburden becomes too great to be removed economically or until the end of the coal seam or property is reached. Figure C-7 depicts a cross-section and plan view of a portion of a strip coal mine. Both single and multiple seams, near the surface, can be mined in this manner.

Overburden removal can be accomplished with almost any kind of earth-moving equipment, but bucket-wheel excavators, draglines, and shovels are the three kinds of equipment used at large area-stripping operations. Bucket-wheel excavators are used extensively in Europe, but in the United States the dominant machines are draglines and shovels. This is not strictly a matter of preference, but results from the nature of the overburden material. In the United States much of the overburden contains layers of shale, limestone, or sandstone that must be drilled and blasted before it can be removed. Draglines and shovels are more efficient in these materials than a bucket-wheel excavator. After the overburden is removed, coal is

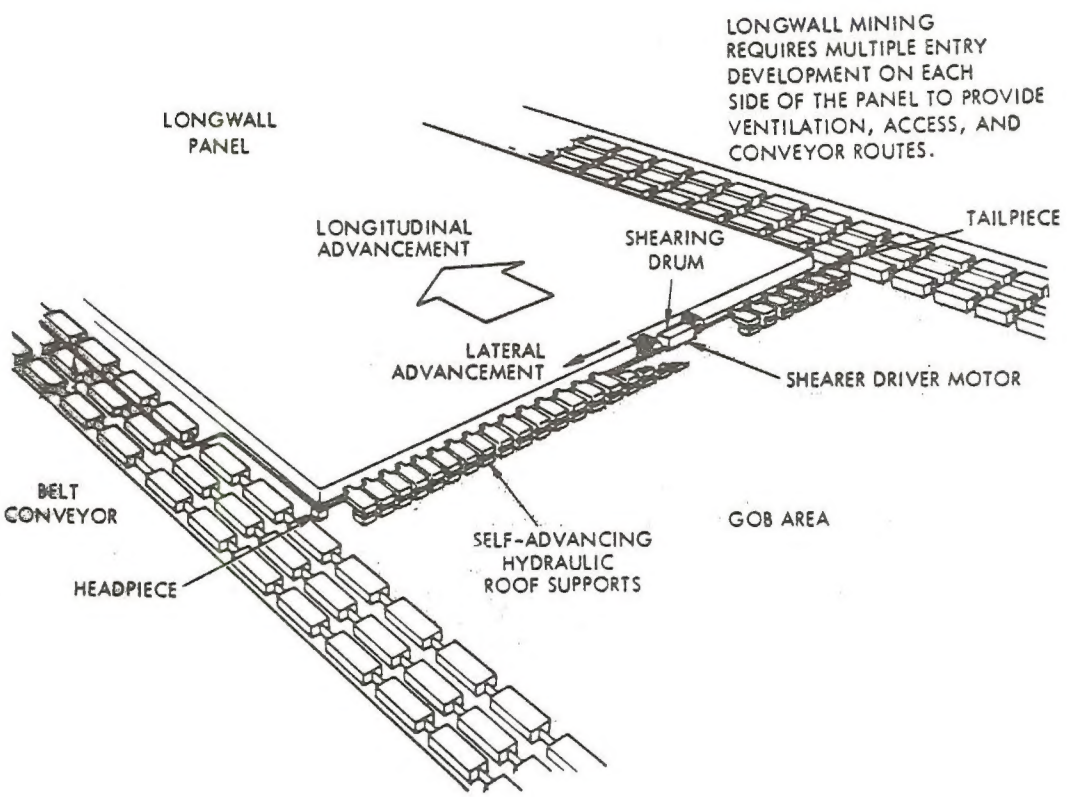
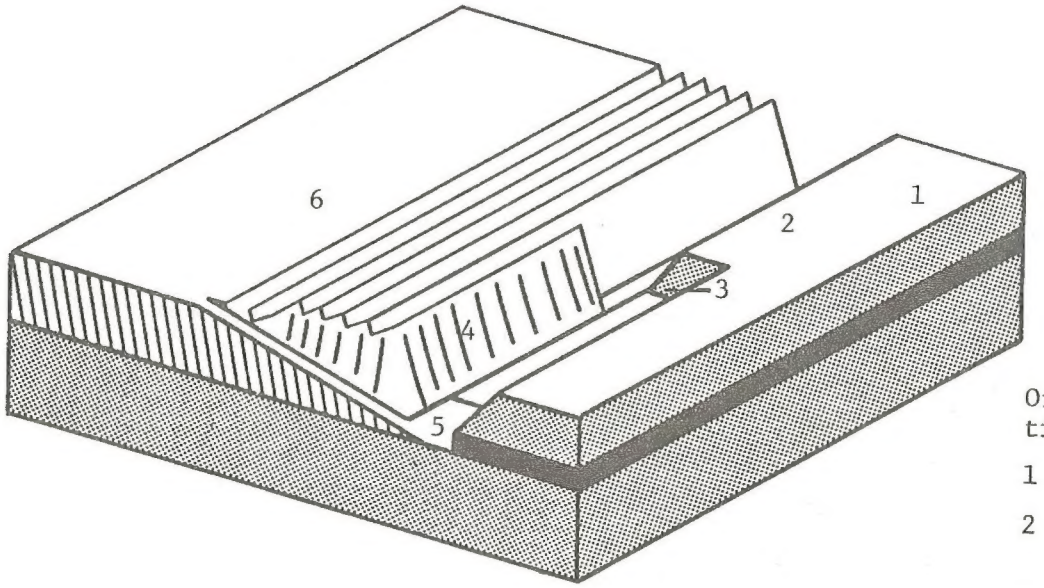


FIGURE C-4

LONGWALL MINING



Order in which operations are performed:

1 - Topsoil removal

2 - Overburden drilling and blasting

3 - Overburden removal

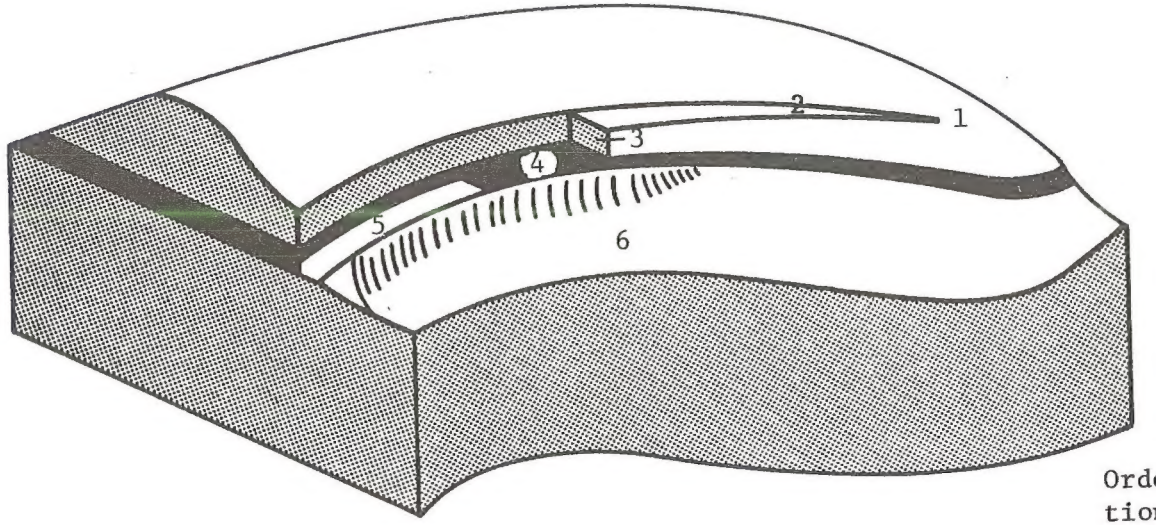
4 - Coal drilling and blasting

5 - Coal loading and hauling

6 - Reclamation

FIGURE C-5

AREA STRIPPING WITH DRAGLINES - HYPOTHETICAL PIT ARRANGEMENT



Order in which operations are performed:

1 - Topsoil removal

2 - Overburden drilling and blasting

3 - Overburden removal

4 - Coal drilling and blasting

5 - Coal loading and hauling

6 - Reclamation

FIGURE C-6

CONTOUR MINING -
HYPOTHETICAL PIT ARRANGEMENT

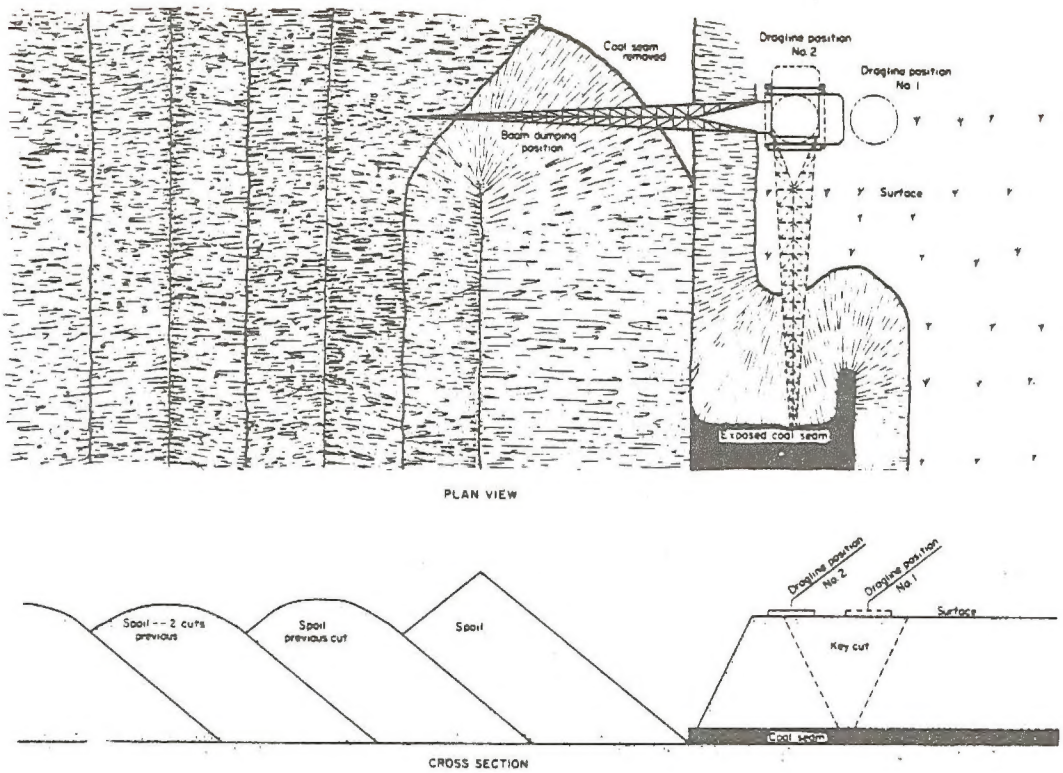


FIGURE C-7

CROSS-SECTION AND PLAN VIEW
OF A PORTION OF A STRIP COAL MINE

usually drilled and blasted. Then it is loaded into coal haulers with either a shovel or a front-end loader.

Contour stripping is practiced on steep terrain, mostly in the Appalachian Coal Region. The method consists of removing overburden from the coalbed with the first cut at or near the outcrop, and proceeding around the hillside. Overburden is stacked along the outer edge of the bench. After the uncovered bed is removed, successive cuts, usually only two or three, are made until the depth of the overburden becomes too great for economic recovery of the coal. Contour mining creates a shelf or bench on the side of the hill. On the inside it is bordered by the highwall, ranging in height from a few feet to more than 100 feet, and on the outer side by a high ridge of spoil. Equipment commonly used for contour stripping is smaller in size and load capacity than that used for area stripping. Dozer and front-end loaders are often used for overburden removal at these operations.

In the eastern United States, auger mining is used on hillside terrain. It requires a surface cut (removal of overburden and a portion of the coal bed) to allow the auger access to the bed. It is often used to recover part of the coal left from underground mining. In the western United States, auger mining is used in conjunction with strip mining. Coal mining by the auger method entails boring horizontal or near horizontal holes in an exposed face of coal and loading the coal removed by the auger. Three choices of auger heads–single, dual or triple–are available to remove up to 90 inches of coal for a distance of over 200 feet. Average depth is about 160 feet. Augering is generally used to supplement recovery at contour or strip mines when the overburden thickness becomes too great to be economically removed. It is also used where the terrain is too steep for overburden removal and where recovery by underground methods would be impractical or unsafe.

In open-pit mining, overburden is removed and placed outside the mining area. The pit increases in size and depth as mining progresses, and it is unusual that the overburden, once removed, is ever returned to the pit. Open-pit mining is used extensively for mining ores of copper and iron, and sand and gravel. Its use in coal mining is being tried where numerous pitching seams lie parallel to each other and outcrop on a relatively flat terrain. The overburden can be removed with either scrapers or shovels loading into trucks.

For quarry-type mining the coalbed typically averages over 60 feet in thickness. It is benched to facilitate its removal. A variation of strip mining of thick coalbeds, it first requires dividing the mine area into 40-acre tracts, for example. Overburden is removed from two tracts, away from the outcrop, with shovel and trucks and spoiled (piled) on land toward the outcrop that will be mined later. Thus, 80 acres of spoil will have to be handled twice. When mining is completed, land that did not produce coal will not have been disturbed. When overburden is removed from a third tract, enough of the thick coal seams will have been mined from the first tract to allow spoiling in the first tract. When mining terminates, the mined area will have an appearance similar to that before mining started, but lower in elevation.

Table C-1 shows the number of acres that would be stripped of overburden each year from a coal deposit to expose the required tonnage to be mined. In actual practice, stripping is 6 months or more ahead of mining. The number of acres disturbed shown in Table C-1 does not include areas impacted by other mining activities such as overburden storage, access roads, utility corridors and the mine plant. These additional disturbed areas could equal that shown in the table.

C.2.3.2 Coal Beneficiation. Crushing and cleaning of mine-run coal is commonly referred to as beneficiation or preparation. Often crushing and sizing is all that is required, but many coal seams, especially those in eastern and midwestern states, contain enough impurities to necessitate further cleaning. Impurities in coal are innumerable, but those occurring in quantity, such as clay, rock, shale, and pyrite, require removal. Processes vary from simple to complex. The simplest are crushing and screening operations which remove large pieces of foreign material, normally through the use of a breaker. Beyond this, whether the process is wet or dry, it is commonly referred to as washing. The dry washing method has advanced from merely blowing the dust from coal to using pulsating air to separate the coal, and largely eliminate the need for close screen sizing. Presently, almost all air-cleaning machines depend on pulsating air. Wet washing of coal is accomplished by floating the coal and sinking the impurities in

TABLE C-1

RELATIONSHIP OF COAL THICKNESS TO PRODUCTION

SEAM THICKNESS IN FEET	TONS OF COAL[a] PER ACRE OF SEAM	ANNUAL PRODUCTION	NO. OF ACRES STRIPPED/YEAR @ 90% RECOVERY
5	8,750	500,000	63.49
		1,000,000	126.98
		2,000,000	253.97
		5,000,000	317.46
10	17,500	500,000	31.75
		1,000,000	63.49
		2,000,000	126.98
		5,000,000	317.46
15	26,250	500,000	21.16
		1,000,000	42.33
		2,000,000	84.66
		5,000,000	211.64
20	35,000	500,000	15.87
		1,000,000	31.75
		2,000,000	63.49
		5,000,000	158.73
20	35,000	500,000	10.58
		1,000,000	21.16
		2,000,000	42.33
		5,000,000	105.82
50	87,500	500,000	6.35
		1,000,000	12.70
		2,000,000	25.40
		5,000,000	63.49
75	131,250	500,000	4.23
		1,000,000	8.46
		2,000,000	16.93
		5,000,000	42.33

[a] Calculated on the basis of 1,750 tons per acre foot.

water. Wet washing starts with breaking and screening the coal to remove the large, hard pieces of impurities. Additional cleaning depends upon the amount, size, and type of impurity, how it is dispersed in the coal, and how the coal is to be used. Equipment can include any or all of the following: jigs, screens, landers, heavy-medium cyclones, tricone separators, concentrating tables, froth flotation, cells, filters, and driers.

Whether the coal to be supplied a given customer is to undergo preparation processing at the mine plant depends upon the customer's needs. Customers using best available control technology (BACT) for emissions can probably use run-of-mine coal directly. Other customers may already have preparation facilities to size the coal to their specific needs.

C.2.4 Land Reclamation

The term reclamation is used here to mean any process for rehabilitating land disturbed by coal mining. The term refers to returning the disturbed land to a condition and/or productivity equal to or higher than that prior to mining. Reclamation consists basically in making a mine site safe, acceptable in appearance, and available for other uses before mine abandonment.

The goals of reclamation related to coal development are different from those of restoration, which can entail, for example, the conversion of waste, desert, marshy or submerged land into farmland. Reclamation is intended to bring the land back to its former values, sometimes including a desert or arid situation.

The aesthetic qualities of coal-mined areas will be changed most drastically in areas with steep topography and 6 inches or less of annual precipitation. Before commitment of an area to coal mining, other developments proposed for adjoining or nearby areas must also be considered. Coal mining may disturb relatively small areas at any one time if rehabilitation is done as soon as possible. However, in combination with environmental impacts from other sources, the added impacts from coal mining could be more serious than if they were the only ones on the landscape. The precise nature of impacts can be determined only when a specific mining proposal is examined. That step is taken by interagency teams making environmental analyses in connection with applications for prospecting and mining plans, in developing stipulations to be incorporated in coal leases, in administering coal leases, in directing rehabilitation measures, and in assessing any unmitigated impacts that remain after all requirements have been met and leases are terminated.

Reclamation consists of four phases: planning, topsoil/overburden segregation, backfilling, and revegetation. The planning phase begins prior to mining and continues throughout the mining cycle. This phase mainly involves: 1) site mapping, 2) identification of the probable effects of mining before mining begins, 3) development of the reclamation plan, including mitigating measures to be followed during all mining activities, 4) preparation of periodic environmental reports, 5) bond and permit fee related activities, 6) supervision of the reclamation work, 7) engineering and surveying for environmental protection, 8) water quality monitoring, 9) dust control, and 10) consultation with outside experts.

Topsoil/overburden segregation and backfilling usually include: 1) removal of vegetative cover when its removal is necessary for topsoil salvage, 2) removing and stockpiling topsoil and overburden separately, 3) backfilling and grading cuts with original overburden, and 4) replacing topsoil [5,6].

Techniques used in the topsoil/overburden segregation and backfilling phases differ according to the type of mining method used. In the Appalachian Coal Region where contour mining is dominant, two mining approaches, box-cut and truck haulback, have been implemented to integrate the topsoil/overburden segregation and backfilling reclamation phases into the mining cycle [7]. Such integration has increased the efficiency of the overall mining process by reducing backfill requirements after overburden removal and spoil placement.

Area strip mining is dominant in most non-Appalachian coal regions. Separation of topsoil from overburden is accomplished by draglines, bucket wheel excavators, and scrapers [8]. In areas with shallow coal seams, the overburden can be removed with a single effort and is referred to as the full-cut technique. In areas with thick overburden, the bench technique is used to rotate overburden from an active cut to a previous cut in its natural sequence. Topsoil is usually applied and graded by draglines and dozers [8,9,10]. Surface configuration methods include: 1) terracing, 2)

pitting, 3) ditching, 4) listering, 5) deep chiseling, and 6) discing.

The revegetation phase usually consists of the following in each coal region: 1) soil preparation (discing, mulching, fertilizing, etc.), 2) seeding and/or planting, 3) reseeding and/or replanting, and 4) irrigation [5,6]. The methods used in each of the four categories differ substantially in various coal regions, due mainly to different topsoil characteristics and environmental conditions.

Most of the Federal coal is in the Rocky Mountain and Northern Great Plains Coal Provinces. The dominant surface uses of Federal land in those two provinces are for livestock forage production, wildlife habitat, watersheds, wide-ranging recreational activities, and timber production. In those provinces, surface mining on Federal lands will occur mainly in nonforested areas. On the other hand, forested terrain is generally such that if coal is mined, it will be by underground methods. Consequently, except for areas disturbed at mine portals and plant sites, the principal effect on existing forests will be from subsidence.

In the Fort Union, Powder River, and Denver-Raton Mesa Coal Regions, revegetation limiting factors are: 1) the amount and distribution of precipitation, 2) soil nutrient concentrations, 3) soil alkalinity and salinity levels, and 4) the suitability and availability of different plant species [11,12]. Most soils are deficient in phosphorus and nitrogen but receive in excess of 12 inches of precipitation annually. Erosion is as serious a problem in some areas as excessive aggregation is in others.

Surface soil replacement is necessary for successful vegetation reestablishment [11]. Spoils are graded to short lengths of gentle-to-moderate slopes and the highest site-production overburden is placed near the surface. Tillage is accomplished by conventional agricultural techniques. Fertilizers are applied for best vegetation success. Gypsum is added to saline soils and irrigation is sometimes necessary during erratic climatic years. Most areas are seeded grass and legume mixtures using established farming practices [9]. Management measures are similar to those described for the San Juan Coal River Region below.

In the San Juan Coal River Region, the major limiting factor to revegetation is water [13]. Precipitation averages 6 inches annually and evapotranspiration is much higher [14]. Another factor is a thin topsoil layer overlying an impermeable overburden, which causes flash flooding and wind erosion. Alkalinity values of the topsoil approach a pH of 9.0, and large amounts of sodium are present.

Irrigation is essential during the first year of revegetation and may be necessary in subsequent years of extraordinarily low rainfall [15]. Currently, the most effective method is to simulate 12-14 inches of effective annual precipitation with sprinkler irrigation in the first growing season, followed with spring irrigation the next growing season [13]. In the Black Mesa Field, irrigation is not normally necessary. Species used for revegetation are selected on the basis of the future land use, which is usually grazing [13].

Revegetation limiting factors in the Uinta-Southwestern Utah and Green River-Hams Fork Coal Regions are similar to those in the San Juan River Coal Region. Revegetation is accomplished by: 1) spoils segregation; 2) addition of topsoil (4-6 inches) selected for nutrient status and moisture capacity; 3) surface manipulation to reduce the rate of surface flow; 4) broad mixture seeding of adapted species; 5) precipitation conservation using slow drainage design, moisture-retaining subsoil, and mulches; and 6) gradient reductions [16].

In the Eastern and Western Interior Coal Regions, the primary limiting factors to revegetation are topsoils with low organic matter, low pH, low nitrogen, and poor tilth [10,17]. These problems are mitigated by the use of fertilizers, lime and leguminous plant species. Conventional farming methods and aerial broadcasting are used in reseeding [10].

Topsoil is not salvaged in the Texas Coal Region because plant nutrients have been leached to subsurface material [5]. Therefore, the latter is used as the growth medium. Bulldozers and scrapers are used to grade soil into gently rolling flatland to be used for row crops, hay meadows, or pasture. Spoil is usually revegetated with Bermuda grass. Seeding, discing, and fertilizing occur in the spring. The second and consecutive years are used for hay, pasture, or both.

A number of reclamation techniques have been tested in recent years which will allow more efficient and economic reclamation. A lateral groove technique allows efficient terracing of steep slopes in areas of rugged terrain, such as the Appalachians [18]. This method allows rapid plant

establishment on easily erodible slopes by increasing soil moisture and producing a "banding" effect of seed and fertilizer.

Dryland planting innovations in Montana include: 1) condensation traps, 2) supplemental rooting, 3) tubelings, and 4) use of plants which are tolerant to drought, alkalinity, and salty soil [19]. Surface manipulation techniques such as deep chiseling, gouging, and dozer basins have increased soil moisture and plant establishment.

A precipitation management method has been successfully used [20] which will aid revegetation in arid and semi-arid regions. This technique involves concentration of precipitation runoff in parallel contours, which increases soil moisture amount and duration of availability to plant roots. In one test, most perennials survived a 1 inch rainfall year (one runoff event).

C.3 FUTURE USES OF COAL

Although coal comprises 90 percent of the country's fossil fuel reserve, only 18 percent of the national energy needs are met with coal. A cornerstone of the National Energy Plan is to correct this imbalance between reserves and consumption. In the near term, conversion of existing facilities in industry to coal from oil and natural gas is encouraged, and construction of new facilities that burn oil or gas prohibited. Expanding future use of coal will depend largely on the successful commercialization of new technologies that convert coal to clean fuels and that permit coal to be burned in an environmentally acceptable manner. Processes are being developed under Federal sponsorship to convert coal into substitutes for oil and natural gas (such as crude oil, fuel oil and distillates; chemical feedstocks; and high, low and intermediate Btu gas) as well as to permit increased use of coal by direct combustion (such as in industrial boilers and process heaters, and as primary fuel for electric power generation).

Coal gasification processes have been commercially available for many years. However, the processes are costly, and, in many cases, limited in the kinds and sizes of coal that can be processed [21].

C.3.1 Coal Gasification

Coal gasification is a process of chemical transformation of solid coal into gas which is essentially methane, carbon monoxide or free hydrogen and virtually free of sulfur. Commercial coal gasification processes in use today outside the United States include the Lurgi, Koppers-Totzek, and Winkler processes. Presently, three types of coal gasification plants are being proposed: low Btu gasifiers for industrial and utility boiler fuels; intermediate-Btu gasifiers producing feed-stock for manufacture of liquid fuels; and high-Btu or synthetic natural gas (SNG) to support declining pipeline quality gas supplies.

Processes currently being developed under the High-Btu Gasification Subprogram of the Department of Energy include: Bi-Gas, Hygas, CO_2 Acceptor, Self-Agglomerating Ash, Synthane, and Hydrane. Figure C-8 is a flow chart for the CO_2 Acceptor Process.

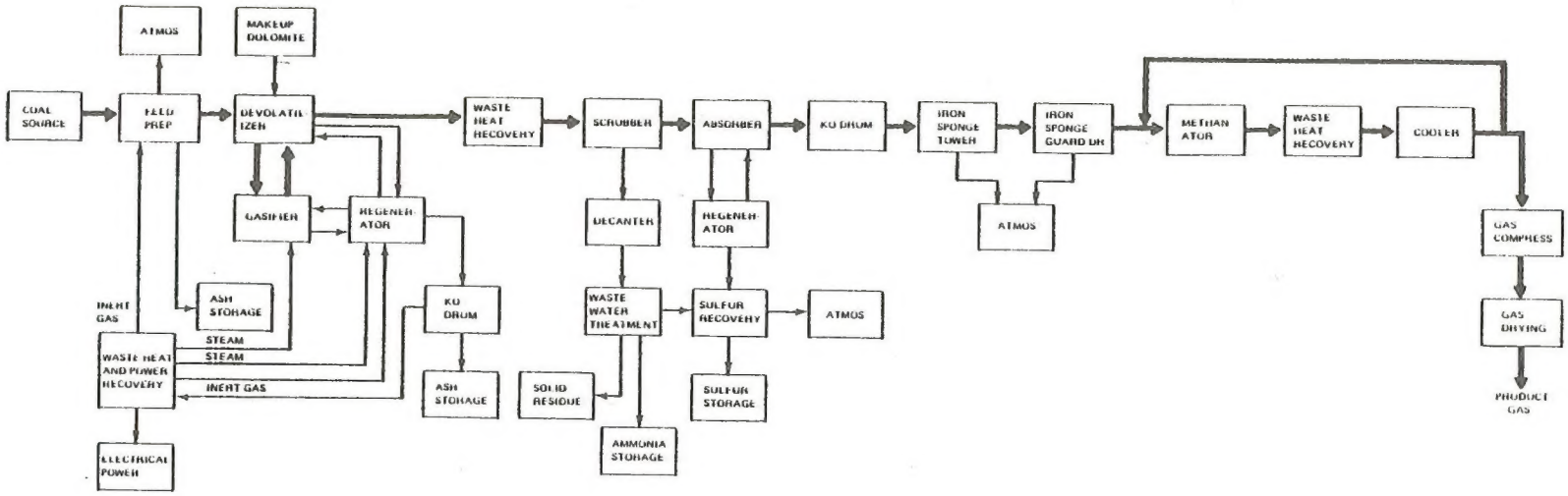
Processes currently being investigated under the Low-Btu Gasification Subprogram of the Department of Energy include: Fixed Bed (Stirred and Slagging), Fluid Bed (Two Stage and Three Stage), Entrained Bed Atmospheric, Combined Cycle, and Molten Salt Pressurized. Figure C-9 is a flow chart of the Fluid Bed, Three Stage Process.

C.3.2 Coal Liquefaction

Coal liquefaction is the conversion of solid coal to a liquid; this involves hydrogenation to depolymerize the coal molecules into simpler molecules. The products derived from coal liquefaction could compete with petroleum-refined products in two markets: first, as a low-ash, low-sulfur boiler fuel suitable for clean electric power generation; and second, as a substitute for high-grade fuels such as gasoline, heating oil, and chemical feedstock. Processes currently being investigated under the Liquefaction Program of the Department of Energy include: H-coal, Synthoil, Solvent Refined Coal, Donar Solvent, Entrained Pyrolysis, and Flash Liquefaction. Figure C-10 is a flow chart of the H-Coal Process.

C.3.3 Direct Combustion

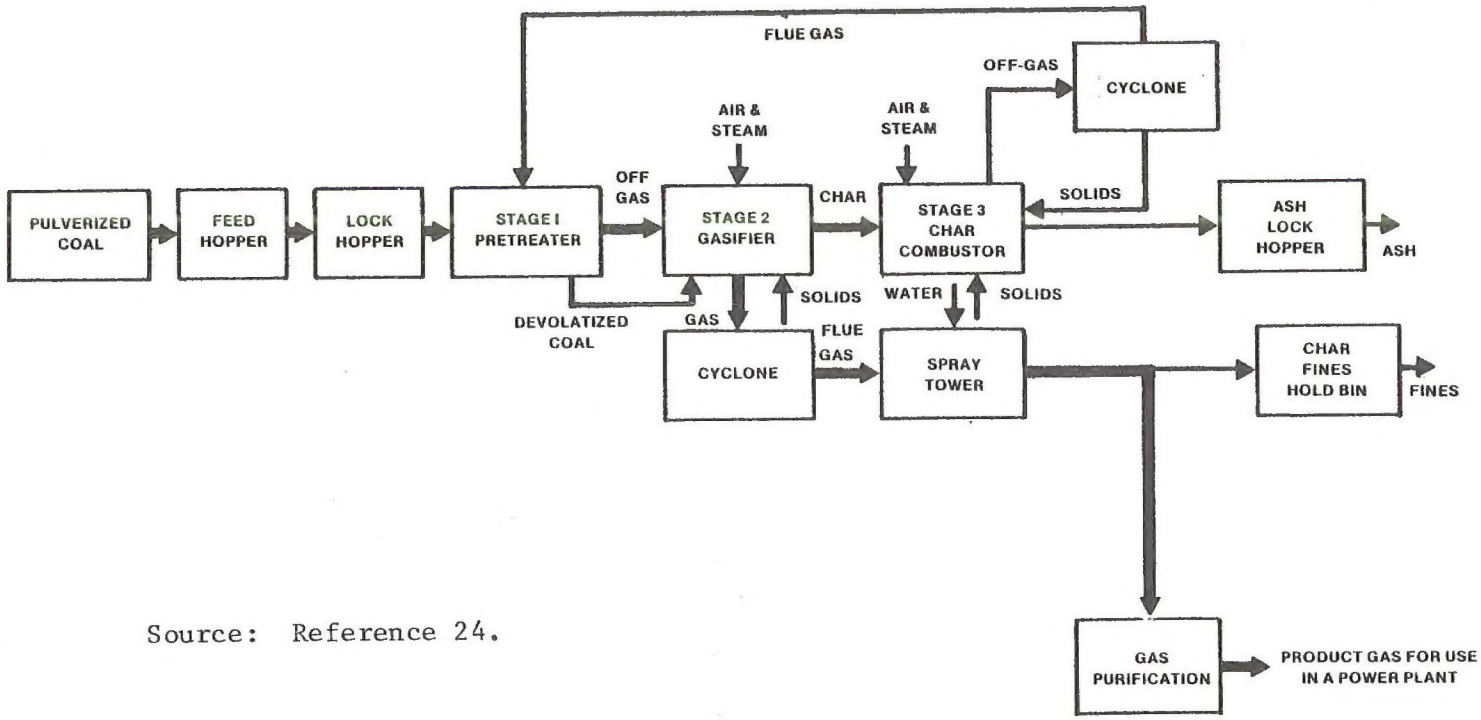
Direct combustion processes are intended to develop fluidized bed combustion systems capable of directly burning high-sulfur coals of all ranks and quality in an efficiently and environmentally acceptable manner. These processes will permit increased utilization of coal by direct combustion in utility, industrial/institutional boilers, for heat and electric power generation. Processes currently being investigated are Fluidized Bed Boilers and



Source: References 22 and 23.

FIGURE C-8

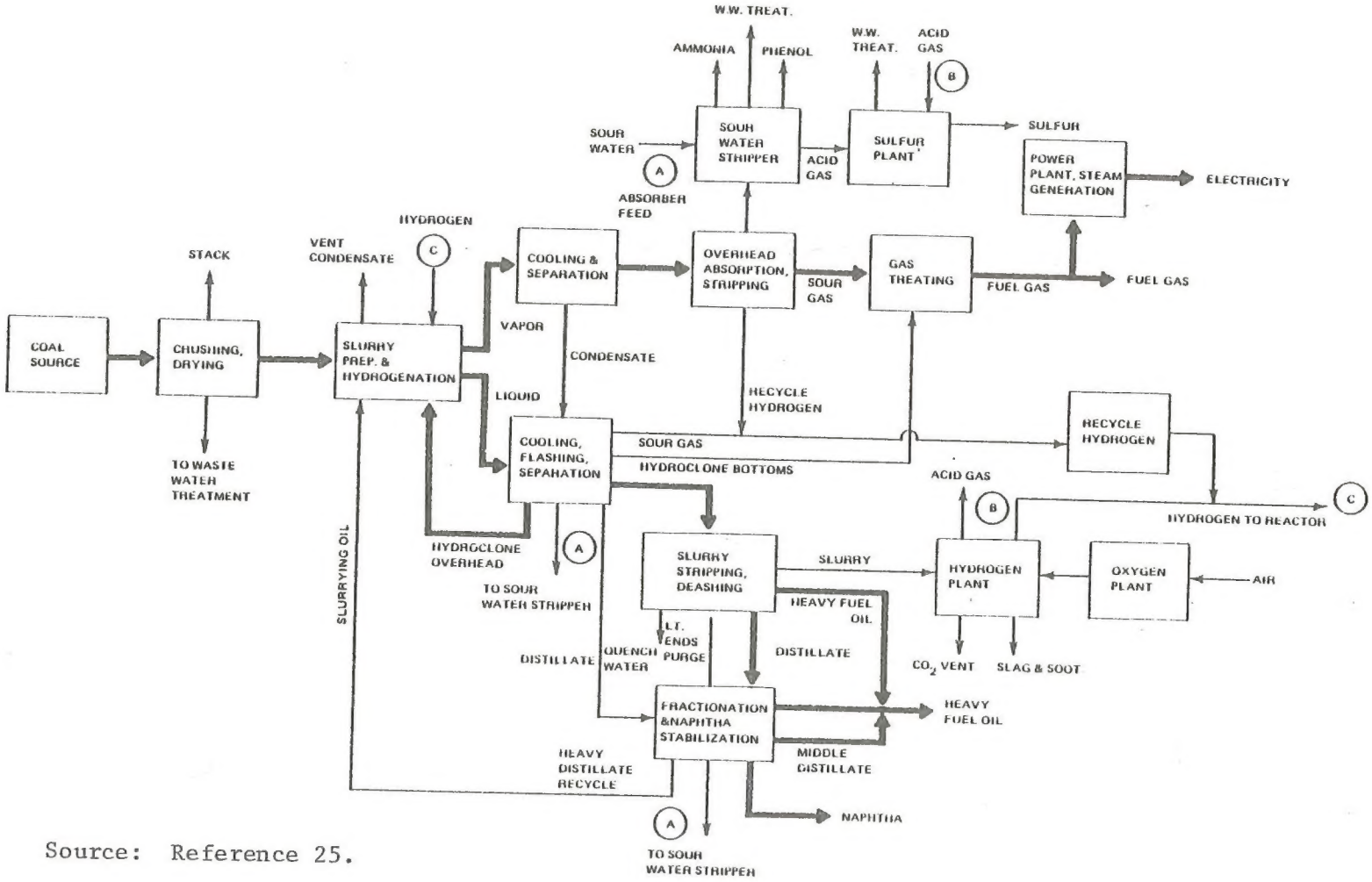
HIGH-BTU GASIFICATION: CARBON DIOXIDE ACCEPTOR



Source: Reference 24.

FIGURE C-9

FLUIDIZED-BED GASIFICATION
BCR THREE-STAGE PRESSURIZED PROCESS



Source: Reference 25.

FIGURE C-10

LIQUEFACTION-DIRECT HYDROGENATION H-COAL PROCESS

Fluidized Bed Combustion. Figure C-11 is a flow chart for the latter process.

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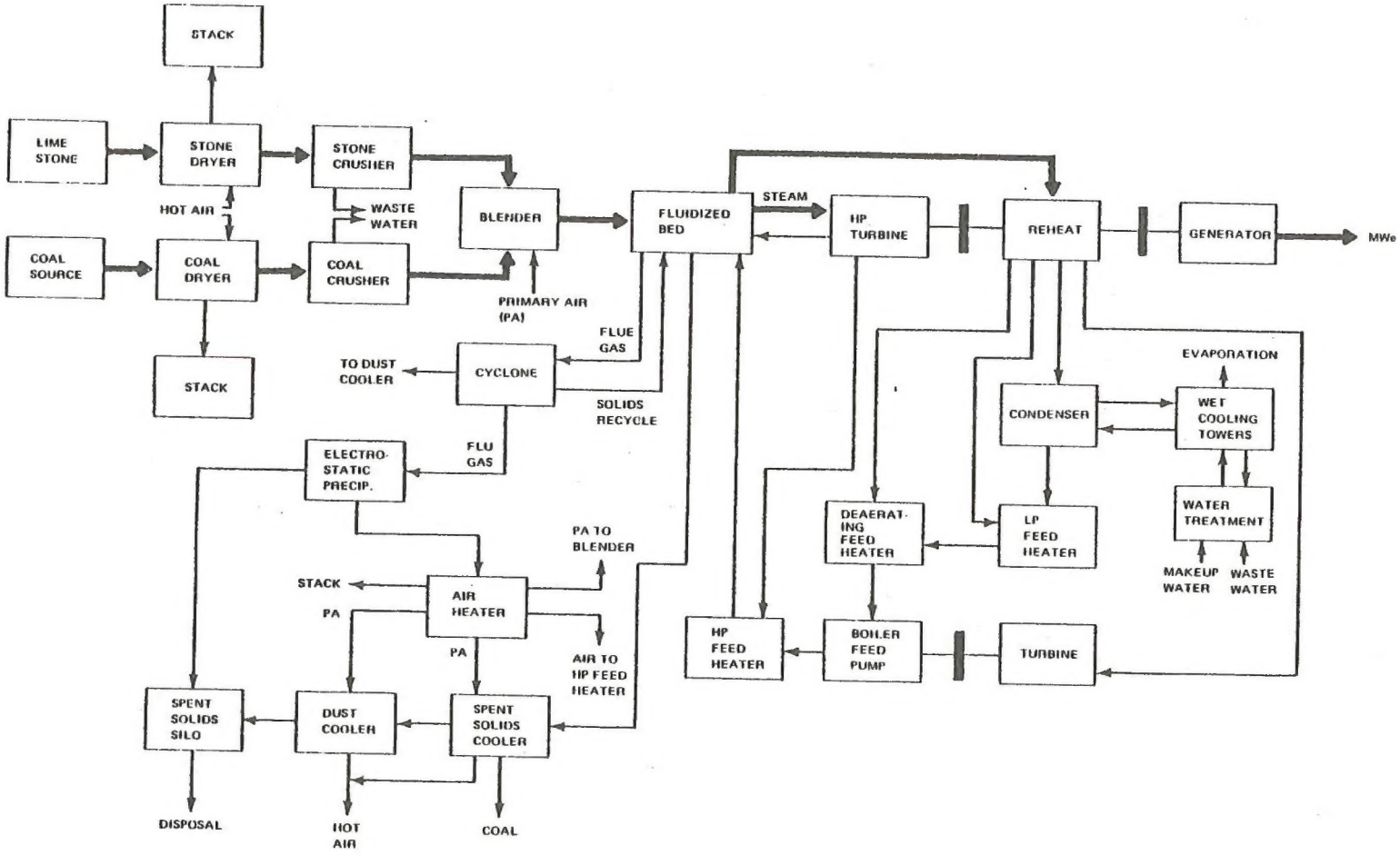
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FIGURE C-11

ADVANCED STEAM CYCLE ATMOSPHERIC FLUIDIZED BED COMBUSTION (FBC)

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APPENDIX D

ECOLOGICAL DATA

TABLE D-1

ESTIMATED REGIONAL CARRYING CAPACITIES
AND PRIMARY PRODUCTIVITIES

REGION	CARRYING CAPACITIES OF OCCUPIED HABITAT	PRODUCTIVITIES PER ACRE/YEAR
Appalachian	2.19 acres/animal unit/month 10 small mammals/acre 1 white-tailed deer/15 acres (high density areas) 1 white-tailed deer/200 acres (low density areas) 3.5 songbirds/acre 1 gamebird/4 acres 1 large predator/500 acres 2-3 reptiles-amphibians/ acre 125-130 pounds fish/acre-reservoir	Hardwood forest 8.9 tons Wetlands 17.8 tons Corn 79.9 bu Soybeans 26.8 bu Hay 1.9 tons Cotton 380 pounds Wheat 38.5 bu Oats 48.3 bu
Eastern Interior	1.7 acres/animal unit/month 10 small mammals/acre 1 white-tailed deer/166 acres 3.5 songbirds/acre 1 gamebird/5 acres 1 large predator/500 acres 2-3 reptiles-amphibians/ acre 125-150 pounds fish/acre-reservoir	Hardwood forest 8.9 tons Prairie 5.8 tons Wetlands 17.8 tons Corn 100.7 bu Soybeans 32.5 bu Hay 1.9 tons Wheat 38.6 bu
Western Interior	2.6 acres/animal unit/month 10 small mammals/acre 1 white-tailed deer/33 acres 3.5 songbirds/acre 1 gamebird/5 acres 1 large predator/500 acres 2-3 reptiles-amphibians/ acre 400 pounds fish/acre-reservoir	Hardwood forest 8.9 tons Prairie 5.8 tons Wetlands 17.8 tons Corn 84.6 bu Soybeans 25.6 bu Hay 2.0 tons Wheat 29.1 bu Cotton 390 pounds

TABLE D-1 (continued)

REGION	CARRYING CAPACITIES OF OCCUPIED HABITAT	PRODUCTIVITIES PER ACRE/YEAR
Texas	6.6 acres/animal unit/month 10 small mammals/acre 1 white-tailed deer/16 acres 3.5 songbirds/acre 1 gamebird/5 acres 1 large predator/500 acres 3-4 reptiles-amphibians/ acre 125-150 pounds fish/acre-reservoir	Hardwood-pine forest 7.1 tons Prairie 5.8 tons Wetlands 17.8 tons Hay 2.3 tons Wheat 2.3 tons Cotton 353 pounds Soybeans 23.6 bu
Powder River	15.5 acres/animal unit/ month 6-10 small mammals/acre 1 antelope/166 acres 1 white-tailed deer/33 acres 1 mule deer/200 acres 1 songbird/acre 1 gamebird/30 acres 1 large predator/500 acres 2.3 reptiles/amphibians 55 pounds trout/acre-stream 250 pounds fish/acre-reservoir	Hardwood forest 5.8 tons Montane evergreen forest 8.0 tons Sagebrush steppe 1.8 tons Prairie 6.7 tons Floodplains 5.4 tons Hay 1.7 tons Wheat 26.2 bu Oats 43.0 bu Sugarbeets 19.5 tons
Green River-Hams Fork	9.3 acres/animal unit/ month 50-60 small mammals/acre 1 antelope/66 acres winter range 1 antelope/250 acres summer range 1 mule deer or elk/125 acres 1 moose/250 acres	Sagebrush steppe 1.8 tons Desert steppe 2.2 tons Pinyon-Juniper 5.4 tons Montane evergreen forest 5.0 tons Corn 95.8 bu Hay 2.2 tons Wheat 23.2 bu Oats 42.0 bu Sugarbeets 18.4 tons

TABLE D-1 (continued)

REGION	CARRYING CAPACITIES OF OCCUPIED HABITAT	PRODUCTIVITIES PER ACRE/YEAR
Green River-Hams Fork (cont.)	2.5 songbird/acre 1 large predator/500 acres 4.5 reptiles-amphibian/acre 55 pounds trout/acre-stream 250 pounds fish/acre-reservoir	
Fort Union	8.2 acres/animal unit/month 8-10 small mammals/acre 1 antelope/125 acres 1 white-tailed deer/33 acres 1 mule deer/200 acres 1 songbird/acre 1 gamebird/7 acres 1 large predator/500 acres 250 pounds fish/acre-reservoir	Prairie 6.7 tons Floodplains 5.4 tons Montane evergreen forest 8.0 tons Hardwood forest 5.8 tons Soybeans 17.3 bu Hay 1.4 tons Wheat 24.6 bu Sugarbeets 19.3 tons
San Juan River	22 acres/animal unit/month 4-6 small mammals/acre 1 mule deer/330 acres 2.5 songbirds/acre 1 gamebird/5 acres 1 large predator/330 acres 2.6 reptiles-amphibians/acre 250 pounds fish/acre-reservoir	Sagebrush steppe 1.8 tons Grasslands 0.5 tons Montane evergreen forest 3.0 tons Corn 96.6 bu Hay 3.6 tons Wheat 35.8 bu Cotton 720.5 pounds Sugarbeets 17.8 tons

TABLE D-1 (concluded)

REGION	CARRYING CAPACITIES OF OCCUPIED HABITAT	PRODUCTIVITIES PER ACRE/YEAR
Uinta-Southwestern Utah	8.3 acres/animal unit/month 4-6 small mammals/acre 1 mule deer/50 acres 1 antelope/150 acres 1 elk/100 acres 2.5 songbirds/acre 1 gamebird/5 acres 1 large predator/500 acres 2.6 reptiles-amphibians/acre 55 pounds trout/acre-stream 250 pounds fish/acre-reservoir	Sagebrush steppe 1.8 tons Mountain hardwood 5.8 tons Montane evergreen forest 8.0 tons Corn 95.8 bu Hay 2.5 tons Wheat 23.3 bu Sugarbeets 17.8 tons
Denver-Raton Mesa	16 acres/animal unit/month 8-10 small mammals/acre 1 mule deer/100 acres 1 antelope/100 acre 2.5 songbirds/acre 1 gamebird/5 acres 1 large predator/500 acres 2.6 reptiles-amphibians/acre 55 pounds trout/acre-stream 250 pounds fish/acre-reservoir	Prairie 7.6 tons Pinyon-Juniper forest 5.9 tons Montane evergreen forest 8.0 tons Sagebrush steppe 1.8 tons Corn 100.8 bu Hay 2.9 tons Wheat 23.4 bu Cotton 380 pounds Sugarbeets 18.6 tons

Sources: Reference Numbers 1, 2, 3, 4, 5, 6, and 7.

TABLE D-2

FEDERALLY PROTECTED SPECIES OF THE FEDERAL COAL REGIONS

Region	Fish	Reptiles and Amphibians	Birds	Mammals	Invertebrates	Plants
Appalachian	Watercress darter (E) (1)		Bachman's warbler (E) (2) Red-cockaded woodpecker (E) (1) Kirtland's warbler (E) (2) Bald Eagle (E) (1/2) Peregrine falcon (E) (2)	Gray bat (E) (1) Indiana bat (E) (1) Eastern cougar (E) (1)	Birdwing pearly mussel (E) (1) Green-blossom pearly mussel (E) (1) Tuberculed-blossom pearly mussel (E) (1) Fine-rayed pigtoe pearly mussel (E) (1) Shiny pigtoe pearly mussel (E) (1) Pink mucket pearly mussel (E) (1) Alabama lamp pearly mussel (E) (1) White warty-back pearly mussel (E) (1) Rough pigtoe pearly mussel (E) (1) Cumberland monkeyface pearly mussel (E) (1) Appalachian monkey face pearly mussel (E) (1) Pale lilliput pearly mussel (E) (1) Cumberland bean pearly mussel (E) (1) Yellow-blossom pearly mussel (E) (1) Turgid-blossom pearly mussel (E) (1) Dromedary pearly mussel (E) (1) Orange-footed pearly mussel (E) (1)	
Eastern Interior			Red-cockaded woodpecker (E) (1) Kirtland's warbler (E) (2) Bald eagle (E) (2) Peregrine falcon (E) (2)	Gray bat (E) (1) Indiana bat (E) (1)	Tuberculated blossom pearly mussel (E) (1) Sampson's pearly mussel (E) (1)	

TABLE D-2 (CONT)

Regions	Fish	Reptiles and Amphibians	Birds	Mammals	Invertebrates	Plants
Western Interior			Red-cockaded woodpecker (E) (1) Bald Eagle (E) (1/2) Whooping Crane (E) (2) Peregrine falcon (E) (2) Eskimo curlew (E) (2) Backman's warbler (E) (2)	Indiana bat (E) (1) Gray bat (E) (1) Red wolf (E) (1)		Northern wild monkshood (T) (1)
Texas	Fountain darter (E) (1)	Texas blind salamander (E) (1) American Alligator (E) (1) Houston toad (E) (1)	Attwater's greater prairie chicken (E) (1) Ivory billed woodpecker (E) Whooping crane (E) (2) Red-cockaded woodpecker (E) (1) Bald eagle (E) (2) Peregrine falcon (E) (2)	Red wolf (E) (1)		Texas wild rice (E) (1)
Powder River			Whooping crane (E) (2) Bald eagle (E) (1) American peregrine falcon (E) (1)	Black-footed ferret (E) (1)		
Green River - Hams Fork	Kendall Warm Springs dace (E) (1)		Whooping crane (E) (2) Bald eagle (E) (2) American peregrine falcon (E) (2)	Gray Wolf (E) (1) Black-footed ferret (E) (1)		

TABLE D-2 (CONCLUDED)

Region	Fish	Reptiles and Amphibians	Birds	Mammals	Invertebrates	Plants
Fort Union			Whooping crane (E) (2) Bald eagle (E) (2) Tule white-fronted goose (T) (2) Peregrine falcon (E) (2)	Black-footed ferret (E) (1) Gray Wolf (E) (1) Northern kit fox* (E)		
San Juan River	Apache trout (T) (1)		Whooping crane (E) (2) Thick-billed parrot (E) (1) Bald Eagle (E) (1/2) Peregrine falcon (E) (2)	Gray wolf (E) (1)		
Uinta-Southwestern Utah	Woundfin (E) (1) Humpback chub (E) (1) Colorado squawfish (E) (1)		Whooping crane (E) (2) Bald eagle (E) (2) Peregrine falcon (E) (2)	Utah prairie dog (E) (1) Black-footed ferret (E) (1)		Rydberg milk vetch (T) (1) Phacelia argillacea (E) (1)
Denver-Raton Mesa	Greenback cutthroat trout (E) (1)		Bald Eagle (E) (1/2) Peregrine falcon (E) (2) Whooping crane (E) (2)	Black-footed ferret (E) (1)		

* Probably not a resident of study area, however, one was trapped in slope County in 1970. (Reference 7)

Sources: Reference Numbers 7, 8, 9, and 10.

KEY

(E) Endangered
(T) Threatened
(1) Permanent resident
(2) Migratory species

TABLE D-3

NUMBER OF SPECIES (BY CATEGORY) CONSIDERED BY STATES AS ENDANGERED, THREATENED, OR WORTHY OF SPECIAL CONSIDERATION

STATE	MAMMALS	BIRDS	FISH	AMPHIBIANS/ REPTILES	INVERTEBRATES	PLANTS
Alabama	7	11	17	16	61	-
Arizona	15	30	23	4	-	-
Colorado	6	8	11	-	-	-
Georgia	9	13	9	14	20	94
Illinois	8	40	13	11	-	-
Indiana	14	4	21	21	17	-
Iowa	25	28	35	23	-	100
Kansas	2	6	6	6	6	-
Kentucky	9	5	5	11	-	28
Maryland	7	-	-	14	-	-
Missouri	15	19	32	15	57	360
Montana	2	2	-	-	-	-
Nebraska	2	2	2	-	-	-
New Mexico	13	34	29	27	1	-
North Dakota	7	-	-	-	-	-
Ohio	4	7	40	8	17	-
Oklahoma	3	7	-	1	-	-
Pennsylvania	-	-	4	11	-	-
South Dakota	1	-	-	-	-	-
Tennessee	4	13	19	3	17	-
Texas	14	12	11	9	-	-
Utah	36	*	*	12	1	264
Virginia	7	4	-	9	-	-
West Virginia	2	3	-	-	3	360
Wyoming	5	8	13	5	-	-

* All species protected

TABLE D-4

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND
TO WILDLIFE DUE TO HABITAT LOSS BASED ON
NO NEW FEDERAL LEASING--LOW-LEVEL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	26,370	139,849	-	9,274	236,410	52,109	-	32,547	-	8,166	1,846	7,000	264,000	92,000	66,000	53	12,040
Central Appalachian	14,715	81,242	-	7,405	59,304	27,351	-	3,572	-	-	1,030	4,000	147,000	52,000	37,000	29	6,719
Southern Appalachian	11,160	59,482	-	4,647	47,476	40,230	36	-	-	-	781	3,000	112,000	39,000	28,000	22	5,096
Eastern Interior	26,055	60,492	-	6,737	898,344	208,751	-	61,983	-	-	1,563	5,000	261,000	91,000	65,000	52	15,326
Western Interior	13,282	32,239	11,672	5,141	156,290	43,790	27	57,742	-	-	398	3,000	133,000	46,000	33,000	27	5,108
Texas	17,108	58,796	33,827	4,532	-	-	190	19,890	-	-	1,026	3,000	171,000	60,000	60,000	34	2,592
Powder River	6,783	2,047	40,157	329	-	-	-	6,032	71	314	274	204	61,000	7,000	17,000	14	438
Green River-Hams Fork	4,992	6,740	6,989	303	1,722	-	-	1,922	73	84	101	800	275,000	12,000	22,000	10	537
Fort Union	3,506	1,013	12,917	599	-	-	-	19,498	-	6,118	149	491	32,000	4,000	9,000	7	428
San Juan River	2,273	8,375	574	143	453	-	<1	789	17	-	4	455	11,000	6,000	6,000	7	41
Uinta-Southwestern Utah	2,550	5,947	2,839	137	831	-	-	897	28	-	26	510	13,000	6,000	7,000	5	307
Denver-Raton Mesa	2,196	3,738	9,410	488	6,123	-	<1	5,795	174	-	34	439	20,000	5,000	6,000	4	135

TABLE D-5

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND
TO WILDLIFE DUE TO HABITAT LOSS BASED ON
NO NEW FEDERAL LEASING--LOW-LEVEL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	24,448	129,671	-	8,599	219,204	48,317	-	30,178	-	7,572	1,711	6,000	244,000	86,000	61,000	49	11,163
Central Appalachian	15,511	85,637	-	7,806	62,513	28,831	-	3,765	-	-	1,086	4,000	155,000	54,000	39,000	31	7,083
Southern Appalachian	10,713	57,099	-	4,461	45,574	38,618	34	-	-	-	750	3,000	107,000	37,000	27,000	21	4,892
Eastern Interior	26,253	60,953	-	6,788	905,171	210,338	-	62,454	-	-	1,575	5,000	263,000	92,000	66,000	53	15,443
Western Interior	13,395	32,513	11,771	5,185	157,620	44,163	27	58,233	-	-	402	3,000	134,000	47,000	33,000	27	5,152
Texas	21,519	73,956	42,345	5,701	-	-	239	25,018	-	-	1,291	4,000	215,000	75,000	75,000	43	3,260
Powder River	8,455	2,551	50,056	410	-	-	-	7,519	89	392	342	254	76,000	8,000	21,000	17	543
Green River-Hams Fork	7,433	10,034	10,406	451	2,563	-	-	2,966	109	125	151	1,190	409,000	19,000	33,000	15	799
Fort Union	5,115	1,478	18,545	874	-	-	-	28,446	-	8,925	216	716	46,000	5,000	13,000	10	624
San Juan River	3,441	12,679	869	217	685	-	1	1,194	25	-	6	688	17,000	9,000	9,000	10	312
Uinta-Southwestern Utah	3,412	7,957	3,789	183	1,112	-	-	1,200	38	-	35	682	17,000	9,000	9,000	7	411
Denver-Raton Mesa	3,431	5,840	14,702	762	9,566	-	<2	9,053	272	-	54	686	31,000	9,000	9,000	7	210

TABLE D-6

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND
TO WILDLIFE DUE TO HABITAT LOSS BASED ON
NO NEW FEDERAL LEASING--MID-LEVEL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,870	137,213	-	9,099	231,954	51,127	-	31,934	-	8,014	1,811	6,000	259,000	91,000	65,000	52	11,813
Central Appalachian	15,800	87,210	-	7,949	63,661	29,361	-	3,834	-	-	1,106	4,000	158,000	55,000	39,000	32	7,213
Southern Appalachian	15,300	81,553	-	6,371	65,092	55,157	49	-	-	-	1,071	4,000	153,000	54,000	38,000	31	6,987
Eastern Interior	26,295	61,051	-	6,799	906,619	210,674	-	62,554	-	-	1,578	5,000	263,000	92,000	66,000	53	15,468
Western Interior	16,386	39,773	14,400	6,343	192,815	54,024	33	71,236	-	-	492	3,000	164,000	57,000	41,000	33	6,302
Texas	32,707	81,476	46,875	6,381	-	-	263	27,562	-	-	1,427	5,000	237,000	83,000	83,000	47	3,592
Powder River	8,426	2,542	49,884	409	-	-	-	7,494	89	390	341	250	76,000	8,000	2,100	17	544
Green River-Hams Fork	8,210	11,083	11,494	499	2,831	-	-	3,276	121	138	165	1,310	452,000	21,000	37,000	16	883
Fort Union	4,190	1,211	15,437	716	-	-	-	23,302	-	7,311	178	590	38,000	4,000	10,000	8	511
San Juan River	3,100	11,422	783	196	617	-	1	1,075	23	-	5	620	15,000	8,000	8,000	9	56
Uinta-South-western Utah	2,793	6,513	3,110	150	910	-	-	982	31	-	3	560	14,000	7,000	7,000	6	337
Denver-Raton Mesa	2,921	4,972	12,517	649	8,144	-	<1	7,708	231	-	46	580	26,000	7,000	8,000	6	179

TABLE D-7

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND
TO WILDLIFE DUE TO HABITAT LOSS BASED ON
NO NEW FEDERAL LEASING--MID-LEVEL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,125	149,173	- -	9,893	252,172	55,583	- -	34,717	- -	8,711	1,969	7,000	281,000	98,000	70,000	56	12,842
Central Appalachian	18,662	103,033	- -	9,391	75,212	34,688	- -	4,530	- -	- -	1,306	5,000	187,000	65,000	47,000	37	8,521
Southern Appalachian	16,311	86,936	- -	6,792	69,389	58,798	52	- -	- -	- -	1,142	4,000	163,000	57,000	41,000	33	7,448
Eastern Interior	28,393	65,921	- -	7,341	978,955	2,274	- -	67,545	- -	- -	1,704	6,000	284,000	99,000	71,000	57	16,702
Western Interior	25,876	62,808	22,739	10,016	30,448	85,312	52	112,492	- -	- -	776	5,000	259,000	91,000	65,000	52	9,952
Texas	43,684	150,132	86,375	11,573	- -	- -	485	50,787	- -	- -	2,621	9,000	437,000	153,000	153,000	87	6,619
Powder River	12,535	3,782	74,210	609	- -	- -	- -	11,148	132	581	506	376	115,000	13,000	31,000	25	809
Green River-Hams Fork	9,822	13,259	13,751	596	3,387	- -	- -	3,919	145	165	199	1,570	540,000	25,000	44,000	20	1,056
Fort Union	8,517	2,462	31,379	1,456	- -	- -	- -		- -	14,861	361	1,192	77,000	9,000	21,200	17	1,039
San Juan River	6,430	23,692	1,624	406	1,281	- -	2		47	- -	10	1,280	32,000	16,000	17,000	19	582
Uinta-South-western Utah	3,439	8,019	3,829	184	1,121	- -	- -		38	- -	35	680	17,000	9,000	9,000	7	416
Denver-Raton Mesa	4,523	7,699	19,382	1,005	12,610	- -	<1		358	- -	72	904	41,000	11,000	12,000	9	277

TABLE D-8

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON NO NEW FEDERAL LEASING--HIGH-LEVEL PRODUCTION 1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	26,711	141,673	- -	9,395	239,494	52,789	- -	32,972	- -	8,273	1,870	7,000	267,000	93,000	67,000	53	12,197
Central Appalachian	14,754	81,457	- -	7,425	59,462	2,724	- -	3,581	- -	- -	1,033	4,000	148,000	52,000	37,000	30	6,737
Southern Appalachian	15,970	85,119	- -	6,650	67,938	57,569	51	- -	- -	- -	1,118	4,000	16,000	56,000	40,000	32	7,292
Eastern Interior	25,835	59,983	- -	6,680	890,759	206,989	- -	61,460	- -	- -	1,555	5,000	258,000	90,000	65,000	52	151,970
Western Interior	16,816	40,817	14,778	6,509	197,875	5,544	34	73,105	- -	- -	504	3,000	168,000	59,000	42,000	34	6,468
Texas	22,649	77,839	44,783	6,000	- -	- -	252	26,332	- -	- -	1,359	5,000	226,000	79,000	79,000	45	3,432
Powder River	10,947	3,303	64,809	531	- -	- -	- -	9,736	115	507	442	329	99,000	11,000	27,000	22	706
Green River-Hams Fork	10,106	13,643	14,148	614	3,485	- -	- -	4,033	149	170	205	1,620	556,000	25,000	45,000	20	1,087
Fort Union	7,490	2,164	27,596	1,280	- -	- -	- -	41,654	- -	13,069	317	1,050	67,000	7,000	19,000	15	913
San Juan River	4,884	17,995	1,233	308	973	- -	2	1,694	36	- -	8	977	24,000	12,000	13,000	15	88
Uinta-Southwestern Utah	3,248	7,574	3,616	174	1,059	- -	- -	1,142	36	- -	32	650	16,000	8,000	8,000	6	391
Denver-Raton Mesa	3,577	6,089	15,328	795	9,973	- -	<1	9,439	283	- -	56	715	32,000	9,000	9,000	7	219

TABLE D-9

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON NO NEW FEDERAL LEASING--HIGH-LEVEL PRODUCTION 1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	40,800	216,400	- -	14,351	365,818	80,633	- -	50,363	- -	12,637	2,856	1,000	408,000	143,000	102,000	82	18,630
Central Appalachian	21,148	116,758	- -	10,642	85,213	39,309	- -	5,134	- -	- -	1,480	5,000	211,000	74,000	53,000	42	9,657
Southern Appalachian	20,912	111,460	- -	8,708	88,962	75,384	67	- -	- -	- -	1,464	5,000	209,000	73,000	52,000	42	9,549
Eastern Interior	31,554	73,260	- -	8,159	1,087,942	252,809	- -	75,065	- -	- -	1,893	600	316,000	110,000	79,000	63	18,561
Western Interior	30,886	74,968	27,142	11,955	363,438	101,830	62	134,273	- -	- -	927	600	309,000	108,000	77,000	62	11,879
Texas	48,676	167,288	96,246	12,896	- -	- -	541	56,590	- -	- -	2,921	1,000	487,000	170,000	170,000	97	7,375
Powder River	13,221	3,993	78,337	642	- -	- -	- -	11,768	- -	613	535	400	119,000	13,000	33,000	26	854
Green River-Hams Fork	11,197	15,116	15,676	680	3,862	- -	- -	4,468	139	188	226	1,800	616,000	28,000	50,000	22	1,204
Fort Union	11,287	3,262	41,585	1,929	- -	- -	- -	62,770	165	19,694	478	1,580	102,000	11,000	28,000	23	1,376
San Juan River	9,492	34,973	15,344	599	1,891	- -	4	3,293	70	- -	15	1,900	47,000	24,000	25,000	28	860
Uinta-Southwestern Utah	4,487	10,464	4,996	241	1,462	- -	---	1,578	49	- -	45	900	22,000	11,000	12,000	9	541
Denver-Raton Mesa	5,215	8,877	27,347	1,158	1,454	- -	<1	13,761	413	- -	82	1,044	47,000	13,000	14,000	10	320

TABLE D-10

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE
DUE TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
LOW-LEVEL COAL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	26,372	139,875	- -	9,276	236,455	52,119	- -	32,553	- -	8,168	1,846	7,000	264,000	92,000	66,000	53	12,042
Central Appalachian	14,715	81,242	- -	7,405	59,304	27,351	- -	3,572	- -	- -	1,030	4,000	147,000	52,000	37,000	29	6,719
Southern Appalachian	11,160	59,482	- -	4,647	47,476	40,230	36	- -	- -	- -	781	3,000	112,000	39,000	28,000	22	5,096
Eastern Interior	26,055	59,482	- -	6,737	898,344	208,751	- -	61,983	- -	- -	1,563	5,000	261,000	91,000	65,000	52	15,326
Western Interior	13,275	32,222	11,666	5,138	15,608	43,767	27	57,711	- -	- -	398	2,000	133,000	46,000	33,000	27	5,106
Texas	17,129	58,868	33,869	4,538	- -	- -	190	19,914	- -	- -	1,028	3,000	171,000	60,000	60,000	34	2,595
Powder River	6,783	2,047	40,15[illegible]	329	- -	- -	- -	6,032	71	314	274	200	61,000	7,000	17,000	14	438
Green River-Hams Fork	4,992	6,740	6,989	303	1,722	- -	- -	1,992	73	84	101	800	275,000	12,000	22,000	10	537
Fort Union	3,805	1,099	14,019	650	- -	- -	- -	21,161	- -	6,639	161	530	34,000	4,000	10,000	8	464
San Juan River	2,273	8,375	574	1,430	453	- -	<1	789	17	- -	4	455	11,000	6,000	6,000	7	41
Uinta-Southwestern Utah	2,550	5,947	2,839	137	831	- -	- -	997	28	- -	30	510	13,000	6,000	7,000	5	307
Denver-Raton Mesa	2,196	3,738	9,410	488	6,123	- -	<1	5,795	174	- -	34	440	20,000	5,000	6,000	4	135

TABLE D-11

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE
TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
LOW-LEVEL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	24,805	131,564	-	8,725	222,405	49,022	-	30,619	-	7,683	1,736	6,000	248,000	87,000	62,000	50	11,326
Central Appalachian	15,507	85,614	-	7,804	62,496	28,823	-	3,764	-	-	1,085	4,000	155,000	54,000	39,000	31	7,081
Southern Appalachian	10,713	57,099	-	4,461	45,574	38,618	34	-	-	-	750	3,000	107,000	37,000	27,000	21	4,892
Eastern Interior	26,254	60,955	-	6,788	905,205	210,346	-	62,456	-	-	1,575	5,000	263,000	92,000	66,000	53	15,444
Western Interior	13,390	32,501	11,767	5,183	157,561	44,146	27	58,211	-	-	402	3,000	134,000	47,000	33,000	27	5,510
Texas	21,400	73,547	42,314	5,699	-	-	238	24,879	-	-	1,284	4,000	214,000	75,000	75,000	43	3,242
Powder River	8,472	2,556	50,156	411	-	-	-	7,534	89	389	342	254	76,000	8,000	21,000	17	547
Green River-Hams Fork	7,698	10,393	10,777	467	2,655	-	-	3,072	113	129	156	1,232	423,000	19,000	35,000	15	828
Fort Union	5,115	1,478	18,845	874	-	-	-	28,446	-	8,925	216	716	46,000	5,000	13,000	10	624
San Juan River	3,480	12,822	176	220	693	-	1	1,207	26	-	6	700	15,000	9,000	9,000	20	315
Uinta-Southwestern Utah	3,508	8,180	3,906	188	1,143	-	-	1,233	39	-	35	702	18,000	9,000	9,000	14	423
Denver-Raton Mesa	3,442	5,859	14,749	765	9,597	-	-	9,082	272	-	54	688	31,000	9,000	9,000	7	211

TABLE D-12

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
MID-LEVEL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,865	137,186	- -	9,098	231,909	51,117	- -	31,927	- -	8,011	1,811	6,000	259,000	91,000	65,000	52	11,810
Central Appalachian	15,689	86,620	- -	7,895	63,230	29,162	- -	3,808	- -	- -	1,098	4,000	157,000	55,000	39,000	31	7,164
Southern Appalachian	14,990	79,896	- -	6,242	63,769	54,036	48	- -	- -	- -	1,049	4,000	150,000	52,000	37,000	30	6,845
Eastern Interior	26,430	61,363	- -	6,834	911,274	211,756	- -	62,875	- -	- -	1,586	5,000	264,000	93,000	66,000	53	15,547
Western Interior	15,715	38,145	13,810	6,083	184,920	51,812	32	68,319	- -	- -	471	3,000	157,000	55,000	39,000	31	6,044
Texas	23,967	82,369	47,389	6,350	- -	- -	266	27,864	- -	- -	1,438	5,000	240,000	84,000	84,000	48	3,631
Powder River	8,446	2,548	50,002	410	- -	- -	- -	7,511	89	391	341	253	76,000	8,000	21,000	17	543
Green River-Hams Fork	8,571	11,571	11,999	520	2,956	- -	- -	3,420	126	144	173	1,371	471,000	21,000	19,000	17	922
Fort Union	4,505	1,302	16,598	770	- -	- -	- -	25,054	- -	7,861	190	631	41,000	5,000	11,000	9	549
San Juan River	3,109	11,455	785	196	619	- -	1	1,079	23	- -	5	622	16,000	8,000	8,000	9	56
Uinta-South-western Utah	2,869	6,691	3,194	154	935	- -	- -	1,009	32	- -	29	574	14,000	7,000	7,000	6	346
Denver-Raton Mesa	3,048	5,188	13,061	477	8,498	- -	< 1	8,043	241	- -	48	610	27,000	8,000	8,000	6	187

TABLE D-13

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
MID-LEVEL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,162	149,369	-	9,906	252,504	55,657	-	34,763	-	8,722	1,971	7,000	282,000	99,000	70,000	56	12,859
Central Appalachian	18,474	101,995	-	9,297	74,454	34,338	-	4,484	-	-	1,293	5,000	185,000	65,000	46,000	37	8,436
Southern Appalachian	16,263	86,681	-	6,772	69,184	58,625	52	-	-	-	1,138	4,000	163,000	57,000	41,000	33	7,426
Eastern Interior	28,039	65,100	-	7,250	966,750	224,647	-	66,703	-	-	1,682	6,000	280,000	98,000	70,000	56	16,494
Western Interior	25,215	61,204	22,159	9,760	296,707	83,133	51	109,619	-	-	756	5,000	252,000	88,000	63,000	50	9,698
Texas	41,043	141,055	81,153	10,873	-	-	456	47,716	-	-	2,463	8,000	410,000	144,000	144,000	82	6,219
Powder River	15,433	4,656	91,367	749	-	-	-	13,725	162	715	624	463	139,000	15,000	39,000	31	996
Green River-Hams Fork	11,466	15,479	16,052	696	3,954	-	-	4,575	169	193	232	1,834	631,000	29,000	52,000	23	1,233
Fort Union	8,021	2,318	29,552	1,371	-	-	-	44,607	-	13,996	340	1,123	72,000	8,000	20,000	16	978
San Juan River		21,028	288	360	1,137	-	2	1,980	42	-	9	1,142	29,000	14,000	15,000	17	517
Uinta-South-western Utah	3,389	7,903	3,773	182	1,105	-	-	1,192	37	-	34	680	17,000	8,000	9,000	7	408
Denver-Raton Mesa	4,531	7,712	19,416	12,633	12,633	-	<1	11,956	359	-	72	906	41,000	11,000	12,000	9	278

TABLE D-14

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
HIGH-LEVEL COAL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	26,648	14,134	- -	9,373	238,929	52,664	- -	32,894	- -	8,253	1,865	7,000	266,000	93,000	67,000	53	12,168
Central Appalachian	14,515	80,137	- -	7,304	58,498	26,980	- -	3,523	- -	- -	1,016	4,000	145,000	51,000	36,000	29	6,628
Southern Appalachian	15,915	84,826	- -	6,627	67,704	57,371	51	- -	- -	- -	1,114	4,000	159,000	56,000	40,000	32	7,267
Eastern Interior	25,585	59,402	- -	6,615	882,139	204,986	- -	60,865	- -	- -	1,535	5,000	256,000	90,000	64,000	51	15,050
Western Interior	17,924	43,506	15,751	6,938	210,913	59,095	36	77,922	- -	- -	538	4,000	179,000	63,000	45,000	36	6,894
Texas	20,798	71,478	41,123	5,510	- -	- -	231	2,418	- -	- -	124	4,000	208,000	73,000	73,000	42	3,151
Powder River	11,760	3,548	69,622	571	- -	- -	- -	10,459	124	545	476	353	106,000	12,000	29,000	24	739
Green River-Hams Fork	12,539	16,927	17,555	761	4,324	- -	- -	5,004	185	211	254	2,000	690,000	31,000	56,000	25	1,348
Fort Union	7,543	2,180	27,791	1,289	- -	- -	- -	41,949	- -	13,162	319	1,056	68,000	8,000	19,000	15	920
San Juan River	4,901	18,058	1,237	309	976	- -	2	1,700	36	- -	8	980	25,000	12,000	13,000	15	88
Uinta-South-western Utah	3,309	7,716	3,684	177	1,078	- -	- -	1,163	36	- -	33	662	17,000	8,000	9,000	7	399
Denver-Raton Mesa	3,641	6,197	15,602	809	10,151	- -	<1	9,608	288	- -	58	728	33,000	9,000	9,000	7	723

TABLE D-15

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON THE PREFERRED PROGRAM ALTERNATIVE
HIGH-LEVEL COAL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	41,381	219,482	-	14,555	371,027	8,178	-	51,080	-	12,816	2,897	10,000	414,000	145,000	103,000	83	18,895
Central Appalachian	20,984	115,853	-	10,560	84,570	39,004	-	5,094	-	-	1,469	5,000	210,000	73,000	52,000	42	9,582
Southern Appalachian	22,139	109,094	-	9,219	98,185	79,807	71	-	-	-	1,550	6,000	221,000	77,000	55,000	44	10,109
Eastern Interior	31,559	62,742	-	8,160	1,088,115	252,849	-	75,077	-	-	1,894	6,000	316,000	110,000	79,000	63	18,564
Western Interior	28,566	69,338	25,103	11,057	336,138	94,181	57	124,187	-	-	857	6,000	286,000	100,000	71,000	57	10,987
Texas	44,683	153,565	88,350	11,838	-	-	496	51,948	-	-	2,681	9,000	447,000	156,000	156,000	89	6,770
Powder River	21,767	6,567	128,866	1,057	-	-	-	19,358	229	1,009	880	654	196,000	22,000	54,000	44	1,404
Green River-Hams Fork	15,931	21,507	22,303	967	5,494	-	-	6,357	235	268	323	2,548	876,000	40,000	72,000	32	1,713
Fort Union	10,604	3,065	39,068	1,813	-	-	-	58,972	-	18,503	448	1,484	95,000	110,000	27,000	21	1,293
San Juan River	9,337	34,403	472	589	1,860	-	3	3,239	69	-	15	1,868	47,000	23,000	24,000	28	846
Uinta-South-western Utah	4,648	10,839	5,175	249	1,515	-	-	1,634	51	-	47	930	23,000	12,000	12,000	9	560
Denver-Raton Mesa	5,710	9,719	24,468	1,268	1,592	-	<1	14,707	452	-	90	1,342	51,000	14,000	15,000	11	350

TABLE D-16

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON PREFERENCE RIGHT LEASING APPLICATIONS ONLY LEASING MID-LEVEL COAL PRODUCTION 1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,151	133,399	- -	8,847	225,507	49,706	- -	31,046	- -	7,790	1,761	6,000	252,000	88,000	63,000	50	11,484
Central Appalachian	15,756	87,011	- -	7,931	63,516	29,294	- -	3,826	- -	- -	1,103	4,000	158,000	55,000	39,000	32	7,196
Southern Appalachian	15,064	80,291	- -	6,273	64,084	54,303	48	- -	- -	- -	1,054	4,000	151,000	53,000	38,000	30	6,829
Eastern Interior	26,243	60,929	- -	6,786	904,806	210,258	- -	62,430	- -	- -	1,575	5,000	262,000	92,000	66,000	52	15,437
Western Interior	15,522	37,676	13,641	6,008	182,648	51,175	31	67,480	- -	- -	466	3,000	155,000	54,000	39,000	31	5,970
Texas	23,532	80,874	46,529	6,234	- -	- -	261	27,358	- -	- -	1,412	5,000	235,000	82,000	82,000	47	3,565
Powder River	8,431	2,543	49,914	409	- -	- -	- -	7,498	89	391	341	253	76,000	8,000	21,000	17	544
Green River-Hams Fork	8,316	11,227	11,642	505	2,868	- -	- -	3,318	122	140	169	1,331	457,000	21,000	37,000	17	894
Fort Union	4,506	1,302	16,602	770	- -	- -	- -	25,059	- -	7,862	190	631	41,000	5,000	11,000	9	550
San Juan River	3,093	11,396	781	195	616	- -	1	1,073	23	- -	5	619	15,000	8,000	8,000	9	56
Uinta-South-western Utah	2,813	6,560	3,132	151	917	- -	- -	989	31	- -	29	563	14,000	7,000	7,000	6	339
Denver-Raton Mesa	3,042	5,178	13,035	676	8,481	- -	<1	8,027	241	- -	48	608	27,000	8,000	8,000	6	187

TABLE D-17

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON PREFERENCE RIGHT LEASING APPLICATIONS ONLY LEASING, MID-LEVEL COAL PRODUCTION 1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,118	149,135	-	9,890	252,109	55,570	-	3,470	-	8,709	1,968	7,000	281,000	98,000	70,000	56	12,839
Central Appalachian	18,852	104,082	-	9,487	75,977	35,041	-	4,576	-	-	1,320	5,000	189,000	66,000	47,000	38	8,608
Southern Appalachian	16,456	81,090	-	6,852	70,006	59,321	53	-	-	-	1,152	4,000	165,000	58,000	41,000	33	7,514
Eastern Interior	28,103	65,248	-	7,266	968,957	225,160	-	66,855	-	-	1,686	6,000	281,000	98,000	70,000	56	16,531
Western Interior	24,884	60,400	21,868	9,632	292,812	82,042	50	108,180	-	-	747	5,000	249,000	87,000	62,000	50	9,571
Texas	42,891	147,407	84,807	11,363	-	-	4,762	49,865	-	-	2,573	9,000	429,000	150,000	150,000	86	6,499
Powder River	13,990	4,221	82,824	679	-	-	-	12,442	147	648	566	420	126,000	14,000	35,000	28	903
Green River-Hams Fork	9,747	13,158	13,646	592	3,362	-	-	3,889	143	164	197	1,560	536,000	24,000	44,000	19	1,048
Fort Union	8,407	2,429	30,974	1,437	-	-	-	46,754	-	14,669	356	1,176	76,000	8,000	21,000	17	1,025
San Juan River	6,097	22,464	308	385	1,214	-	2	2,115	45	-	10	1,220	30,000	15,000	16,000	18	552
Uinta-South-western Utah	3,256	7,593	3,625	175	1,061	-	-	1,145	36	-	11	650	160,000	8,000	8,000	7	392
Denver-Raton Mesa	4,440	7,557	19,026	986	12,379	-	<1	11,716	351	-	70	888	40,000	11,000	12,000	9	272

TABLE D-18

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON SHORT TERM LEASING, MID-LEVEL COAL PRODUCTION 1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,146	133,373	-	8,845	225,462	49,696	-	31,040	-	7,788	1,760	6,000	251,000	88,000	63,000	50	1,148
Central Appalachian	15,722	86,801	-	7,912	63,363	29,223	-	3,816	-	-	1,101	4,000	157,000	55,000	39,000	31	7,179
Southern Appalachian	15,088	80,418	-	6,283	64,186	54,390	48	-	-	-	1,056	4,000	151,000	53,000	38,000	30	6,889
Eastern Interior	26,296	61,053	-	6,799	906,654	210,682	-	62,556	-	-	1,578	5,000	263,000	92,000	66,000	53	15,468
Western Interior	15,637	37,955	13,742	6,053	184,002	51,555	31	67,980	-	-	469	3,000	156,000	55,000	39,000	31	6,014
Texas	23,671	81,352	46,804	6,271	-	-	262	27,520	-	-	1,420	5,000	237,000	83,000	83,000	47	3,587
Powder River	8,437	2,546	49,949	410	-	-	-	7,503	89	391	341	253	76,000	80,000	21,000	17	544
Green River-Hams Fork	8,288	11,189	11,603	503	2,858	-	-	3,307	122	139	168	1,326	456,000	21,000	37,000	17	891
Fort Union	4,506	1,302	16,602	770	-	-	-	25,059	-	7,862	190	630	41,000	5,000	11,000	9	550
San Juan River	3,093	11,396	5,781	195	616	-	1	1,073	23	-	5	619	15,000	8,000	8,000	9	280
Uinta-South-western Utah	2,822	6,581	3,142	151	920	-	-	992	31	-	29	565	14,000	7,000	7,000	6	340
Denver-Raton Mesa	3,042	5,178	13,035	676	8,481	-	<1	8,027	241	-	48	608	27,000	8,000	8,000	6	187

TABLE D-19

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON SHORT TERM LEASING, MID-LEVEL COAL PRODUCTION 1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,125	149,473	-	9,893	252,172	55,853	-	34,717	-	8,711	1,969	7,000	281,000	98,000	70,000	56	12,842
Central Appalachian	18,625	102,829	-	9,373	75,063	34,619	-	4,521	-	-	1,304	5,000	186,000	65,000	47,000	37	8,505
Southern Appalachian	16,322	86,996	-	6,797	64,435	58,838	52	4,521	-	-	1,143	4,000	163,000	57,000	41,000	33	7,453
Eastern Interior	28,179	65,424	-	7,286	971,577	225,769	-	67,036	-	-	1,691	6,000	282,000	99,000	70,000	56	16,376
Western Interior	25,243	61,271	22,182	9,771	297,036	83,225	51	109,740	-	-	757	5,000	252,000	88,000	63,000	50	9,709
Texas	42,932	147,547	84,888	11,374	-	-	6,477	49,912	-	-	2,576	9,000	429,000	150,000	150,000	86	6,505
Powder River	12,794	3,860	75,744	621	-	-	-	11,378	134	593	518	384	115,000	13,000	32,000	26	825
Green River-Hams Fork	10,013	13,518	14,018	608	3,453	-	-	3,996	147	168	203	1,402	551,000	25,000	45,000	20	1,077
Fort Union	8,626	2,493	31,781	1,474	-	-	-	47,972	-	15,051	365	1,208	78,000	9,000	22,00	17	1,052
San Juan River	6,341	23,364	320	400	1,261	-	2	2,200	47	-	10	1,268	32,000	16,000	16,000	19	574
Uinta-South-western Utah	3,311	7,721	3,686	177	1,079	-	-	1,164	36	-	33	662	17,000	8,000	9,000	7	399
Denver-Raton Mesa	4,454	7,581	19,086	989	12,418	-	4	11,753	353	-	70	890	40,000	11,000	12,000	9	273

TABLE D-20

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE
DUE TO HABITAT LOSS BASED ON LEASING TO MEET INDUSTRY NEEDS,
MID-LEVEL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,101	133,133	-	8,829	225,059	49,607	-	30,984	-	7,774	1,757	6,000	251,000	88,000	63,000	50	11,462
Central Appalachian	15,173	83,771	-	7,636	61,150	28,203	-	3,683	-	-	1,062	4,000	152,000	53,000	38,000	30	6,928
Southern Appalachian	15,296	81,527	-	6,369	65,071	55,139	49	-	-	-	1,071	4,000	153,000	54,000	38,000	31	6,984
Eastern Interior	26,093	60,581	-	6,747	899,654	209,056	-	82,073	-	-	1,566	5,000	261,000	91,000	65,000	52	15,349
Western Interior	15,405	37,392	13,538	5,963	181,272	50,790	31	66,971	-	-	462	3,000	154,000	54,000	39,000	31	5,925
Texas	22,363	76,857	44,218	5,925	-	-	248	25,999	-	-	1,342	4,000	224,000	78,000	78,000	45	3,388
Powder River	9,111	2,749	53,939	442	-	-	-	8,103	960	422	368	273	82,000	9,000	23,000	18	588
Green River-Hams Fork	11,174	15,084	15,644	678	3,854	-	-	4,459	164	188	226	1,788	615,000	28,000	50,000	22	1,202
Fort Union	4,941	1,428	18,204	845	-	-	-	27,478	-	8,621	208	692	44,000	5,000	12,000	10	603
San Juan River	3,508	12,925	886	221	699	-	1	1,217	26	-	6	700	18,000	9,000	9,000	11	318
Uinta-Southwestern Utah	2,978	6,945	3,316	160	971	-	-	1,047	33	-	30	600	15,000	7,000	8,000	6	359
Denver-Raton Mesa	3,367	5,731	14,428	748	9,387	-	<1	8,885	266	-	54	673	30,000	8,000	9,000	7	207

TABLE D-21

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE
DUE TO HABITAT LOSS BASED ON LEASING TO MEET INDUSTRY NEEDS,
MID-LEVEL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,070	148,881	----	9,873	251,679	55,455	---	34,649	---	8,694	1,965	7,000	281,000	98,000	70,000	56	12,817
Central Appalachian	18,587	102,619	----	9,354	74,909	34,548	---	4,512	---	----	1,301	5,000	186,000	65,000	46,000	37	8,487
Southern Appalachian	16,572	88,327	----	6,901	65,099	59,739	53	----	---	----	1,160	4,000	166,000	58,000	41,000	33	7,567
Eastern Interior	27,135	63,000	----	7,016	93,558	217,404	---	64,552	---	----	1,628	5,000	271,000	95,000	68,000	54	15,962
Western Interior	25,443	61,757	22,359	9,848	299,389	83,885	51	110,610	---	----	763	5,000	254,000	89,000	64,000	51	9,786
Texas	38,402	131,979	75,931	10,174	----	----	426	44,646	---	----	2,304	8,000	384,000	134,000	134,000	77	5,818
Powder River	16,994	5,127	100,609	825	----	----	---	15,113	179	787	688	510	153,000	17,000	42,000	34	1,096
Green River-Hams Fork	13,910	18,778	19,474	845	4,797	----	---	5,551	205	234	281	2,226	765,000	35,000	63,000	28	1,496
Fort Union	8,950	2,587	32,975	1,530	----	----	---	49,774	---	15,617	378	1,254	81,000	9,000	22,000	18	1,091
San Juan River	6,501	23,953	328	410	1,295	----	2	2,255	48	----	10	1,300	33,000	16,000	17,000	20	589
Uinta-Southwestern Utah	3,549	8,277	3,951	190	1,157	----	---	1,248	39	----	35	710	18,000	9,000	9,000	14	428
Denver-Raton Mesa	4,803	8,175	20,581	1,067	13,391	----	<1	12,674	380	----	76	960	43,000	12,000	12,000	10	295

TABLE D-22

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON DEPARTMENT OF ENERGY GOALS MID-LEVEL COAL PRODUCTION 1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,862	137,170	-	9,097	231,882	51,111	-	31,924	-	8,010	1,810	6,000	259,000	91,000	65,000	52	11,809
Central Appalachian	15,667	86,498	-	7,884	63,141	29,121	-	3,803	-	-	1,097	4,000	157,000	55,000	39,000	31	7,154
Southern Appalachian	14,500	77,284	-	6,038	61,685	52,270	46	-	-	-	1,015	4,000	145,000	51,000	36,000	29	6,621
Eastern Interior	25,655	59,564	-	6,633	884,552	205,547	-	61,031	-	-	1,539	5,000	257,000	90,000	64,000	51	15,091
Western Interior	16,392	39,788	14,405	6,345	192,886	54,044	33	71,262	-	-	492	3,000	164	57,000	41,000	33	6,305
Texas	23,137	79,516	6,130	-	-	257	257	26,899	-	-	1,388	5,000	231,000	81,000	81,000	46	3,506
Powder River	8,393	2,533	49,689	407	-	-	-	7,464	88	389	340	250	76,000	80,000	21,000	17	541
Green River-Hams Fork	11,136	15,033	15,590	676	3,841	-	-	4,444	164	187	225	1,800	612,000	28,000	5,000	22	1,197
Fort Union	3,714	1,073	13,684	635	-	-	-	20,655	-	6,480	157	520	33,000	4,000	9,000	7	453
San Juan River	2,747	10,121	694	173	547	-	1	953	20	-	4	550	14,000	7,000	7,000	8	50
Uinta-South-western Utah	2,808	6,548	3,126	151	915	-	-	987	31	-	29	560	14,000	7,000	7,000	6	338
Denver-Raton Mesa	3,626	6,172	15,538	805	10,110	-	<1	9,568	287	-	58	720	33,000	9,000	9,000	7	222

TABLE D-23

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE DUE TO HABITAT LOSS BASED ON DEPARTMENT OF ENERGY GOALS 1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,238	149,772	-	9,932	253,185	55,807	-	34,857	-	8,746	1,977	7,000	282,000	99,000	71,000	56	12,894
Central Appalachian	18,432	101,763	-	9,276	74,285	34,260	-	4,474	-	-	1,290	5,000	184,000	65,000	46,000	37	8,416
Southern Appalachian	15,751	83,952	-	6,559	67,006	56,780	50	-	-	-	1,103	4,000	158,000	55,000	39,000	32	7,192
Eastern Interior	27,532	63,922	-	7,119	949,270	220,581	-	65,497	-	-	1,652	6,000	275,000	96,000	69,000	55	16,195
Western Interior	25,163	61,077	22,113	9,740	296,095	82,962	51	10,393	-	-	755	5,000	252,000	88,000	63,000	50	9,678
Texas	40,351	138,667	79,785	10,690	-	-	448	46,912	-	-	2,421	8,000	404,000	141,000	141,000	81	6,114
Powder River	15,316	4,621	90.675	744	-	-	-	13,621	161	710	620	460	138,000	15,000	38,000	31	988
Green River-Hams Fork	13,792	18,619	19,309	837	47,570	-	-	5,504	203	232	280	2,200	359,000	34,000	62,000	28	1,483
Fort Union	6,336	1,831	23,344	1,083	-	-	-	35,236	-	11,056	268	880	57,000	6,000	160,000	13	773
San Juan River	6,180	22,770	312	390	1,231	-	2	2,144	45	-	10	1,236	31,000	15,000	160,000	19	560
Uinta-South-western Utah	3,128	7,294	3,483	168	1,019	-	-	1,100	34	-	32	620	16,000	8,000	8,000	6	377
Denver-Raton Mesa	4,543	7,733	19,467	1,009	12,666	-	<1	11,988	360	-	72	900	41,000	11,000	12,000	9	279

TABLE D-24

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE
DUE TO HABITAT LOSS BASED ON STATE DETERMINATION,
MID-LEVEL COAL PRODUCTION
1976-1985

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	25,124	133,256	--	8,837	225,265	49,653	--	31,013	--	7,781	1,759	6,000	251,000	88,000	63,000	50	11,472
Central Appalachian	15,984	88,248	--	8,044	64,419	29,710	--	3,880	--	--	1,119	4,000	160,000	56,000	40,000	32	7,299
Southern Appalachian	14,814	78,958	--	6,169	63,020	53,402	47	--	--	--	1,037	4,000	148,000	52,000	37,000	30	6,764
Eastern Interior	26,404	61,303	--	6,827	910,377	211,547	--	62,813	--	--	1,584	5,000	264,000	92,000	66,000	53	15,532
Western Interior	18,796	45,623	16,518	7,275	221,174	61,970	38	81,713	--	--	564	4,000	188,000	66,000	47,000	38	7,229
Texas	25,257	86,803	49,940	6,691	--	--	280	29,364	--	--	1,515	5,000	253,000	88,000	88,000	51	3,827
Powder River	7,769	2,344	45,994	377	--	--	--	6,909	82	360	314	233	70,000	8,000	19,000	16	501
Green River-Hams Fork	6,754	9,118	9,456	410	2,329	--	--	2,695	99	113	138	1,080	371,000	17,000	30,000	14	726
Fort Union	4,977	1,438	18,337	851	--	--	--	27,679	--	8,684	211	700	45,000	5,000	12,000	10	607
San Juan River	3,677	13,548	928	232	732	--	1	1,276	27	--	6	735	18,000	9,000	10,000	11	65
Uinta-South-western Utah	2,850	6,646	3,173	153	929	--	--	1,002	31	--	29	570	14,000	7,000	7,000	6	343
Denver-Raton Mesa	3,104	5,283	13,301	689	8,654	--	<1	8,191	246	--	48	620	28,000	8,000	8,000	6	190

TABLE D-25

POTENTIAL LOSSES TO NATURAL AND AGRICULTURAL PRODUCTION AND TO WILDLIFE
DUE TO HABITAT LOSS BASED ON STATE DETERMINATION,
MID-LEVEL COAL PRODUCTION
1986-1990

COAL REGION	TOTAL LAND COMMITTED (acres)	POTENTIAL PRODUCTIVITY LOSS									POTENTIAL WILDLIFE LOSS						
		FOREST (tons)	RANGE (tons)	PASTURE (tons)	CORN (bu)	SOYBEANS (bu)	COTTON (lbs)	WHEAT (bu)	SUGARBEETS (tons)	OATS (bu)	GAME MAMMALS	GAME BIRDS	SMALL MAMMALS	BIRDS	AMPHIBIANS/ REPTILES	PREDATORS	ANIMAL UNITS
Northern Appalachian	28,296	150,080	-	9,953	253,705	55,921	-	34,928	-	8,764	1,981	7,000	283,000	99,000	71,000	56	12,921
Central Appalachian	18,877	104,220	-	9,499	76,078	35,087	-	4,582	-	-	1,321	5,000	189,000	66,000	47,000	38	8,620
Southern Appalachian	15,542	82,838	-	6,472	66,117	56,026	50	-	-	-	1,088	4,000	155,000	54,000	39,000	31	7,097
Eastern Interior	29,493	68,475	-	7,626	1,016,882	236,296	-	70,162	-	-	1,770	6,000	295,000	103,000	74,000	59	17,349
Western Interior	25,079	60,874	22,039	9,707	295,107	82,685	50	109,027	-	-	752	5,000	251,000	88,00	63,000	50	9,646
Texas	42,560	146,269	84,153	11,275	-	-	473	49,480	-	-	2,554	9,000	426,000	149,000	149,000	85	64,480
Powder River	11,366	3,430	67,290	552	-	-	-	10,108	119	527	460	340	102,000	11,000	28,000	23	733
Green River-Hams Fork	6,720	9,072	9,408	408	2,318	-	-	2,682	99	113	136	1,080	370,000	17,000	30,000	13	723
Fort Union	8,878	2,566	32,709	1,516	-	-	-	49,373	-	15,491	375	1,240	80,000	9,000	22,000	18	1,083
San Juan River	6,700	24,686	338	423	1,334	-	2	2,324	49	-	11	1,340	33,000	17,000	17,000	20	607
Uinta-South-western Utah	3,243	7,563	3,611	174	1,057	-	-	1,140	36	-	32	648	16,000	8,000	8,000	12	391
Denver-Raton Mesa	4,272	7,271	18,306	949	11,911	-	<1	11,273	338	-	68	860	38,000	11,000	11,000	9	262

APPENDIX E

WATER RESOURCES DATA

TABLE E-1

WATER RESOURCES COUNCIL AGGREGATED SUBREGIONS

Region	Aggregated Subregion (ASR)	Basin	Discharge Point(s)
Ohio	501	Allegheny-Monongahela	Allegheny River at Natrona, Pa., above Pittsburgh; and Monongahela River at Braddock, Pa.
	502	Pittsburgh-Cincinnati Little Miami	Ohio River immediately above Kentucky River Junction
	503	Muskigum-Scioto-Great Miami	The junction of each river with the Ohio River Junction.
	504	Kanawha	Kanawha River at Ohio River junction.
	505	Licking and Kentucky, Louisville-Sale, Evansville-Green	Ohio River at Mississipi River junction.
	506	Wabash	Wabash River at Ohio River junction.
	507	Cumberland	Cumberland River at Ohio River junction.
Tennessee	601	Upper Tennessee	Tennessee River at South Pittsburg, TN
	602	Lower Tennessee	Tennessee River at Ohio River junction.
Mississippi	701	Minnesota-Mississippi-St. Croix	Mississippi River at Prescott, WI
	702	Chippewa-Mississippi-Wisconsin	Mississippi River at Wisconsin river junction.
	703	Mississippi to Quad Cities	Mississippi River at Keokuk, IA, and Des Moines River at Keosauqua, IA
	704	Mississippi-Illinois	Mississippi River immediately above Missouri River (Alton, ID)
	705	Mississippi-Kaskaskia-St. Louis	Mississippi River immediately above Ohio River (Thebes, ID)
Souris-Red-Rainy	901	Souris-Red-Rainy	U.S.-Canadian Border (all discharge points).
Missouri	1001	Missouri-Poplar-Milk	Missouri River near Culbertson, MT
	1002	Missouri headwaters to Marias	Missouri River at Virgelle, MT
	1003	Missouri-Musselshell	Missouri River below Fort Peck Dam, MT
	1004	Yellowstone-Bighorn-Powder	Yellowstone River at Missouri River junction (Sidney, MT)
	1005	Little Missouri-Cheyenne-White to Oahe	Missouri River below Ft. Randall, SD

TABLE E-1

WATER RESOURCES COUNCIL AGGREGATED SUBREGIONS (CONCLUDED)

Region	Aggregated Subregion (ASR)	Basin	Discharge Point(s)
Missouri (concluded)	1006	James-Missouri-Big Sioux	Missouri River at Sioux City, IA
	1007	Upper Platte Basins	North Platte River at Lewellan, NE and South Platte River at Julesburg, CO
	1008	Niobrara-Loup-Platte-Elkhorn	Platte River at Louisville, NE, Niobra River, Verdel, NE
	1009	Missouri-Sioux City to Kansas City	Missouri River at Kansas City, MO minus Kansas River at Bonner Aprings, KS
	1010	Republican-Smokey Hill-Blue-Kansas	Kansas River immediately above Missouri River (Bonner Springs, KS)
	1011	Grand-Charitan-Osage-Gasconde-Missouri	Missouri River above Mississippi River Junction (Herman, MO)
Arkansas-White-Red	1101	White	White River at Black River junction (Newport, AR)
	1102	Upper Arkansas	Arkansas River near Coolidge, KS
	1103	Cimarron-Arkansas to Keystone	Arkansas River at Cimarron River junction (Tulsa, OK)
	1104	Verdigris-Neosho-Lower Arkansas	Arkansas River at Little Rock, AR
	1105	Canadian	Canadian River near Whitefield, OK
	1106	Red-Washita	Red River at Dennison Dam, TX
	1107	Lower Red	Red River at Alexandria, LA
Texas-Gulf	1201	Sabine-Neches	Gulf of Mexico
	1202	Trinity-San Jacinto	Gulf of Mexico
	1203	Brazos	Brazos River near Juliff, TX
	1204	Colorado	Gulf of Mexico
	1205	Navidad-Lavaca-Guadalupe-Mission-Nueces	Gulf of Mexico
Upper Colorado	1401	Green-Yampa-White	Green River immediately above Colorado River junction (Green River, UT)
	1402	Gunnison-Colorado-Dolores	Colorado River immediately above Green River junction (near Cisco, UT)
	1403	San Juan-Colorado	Colorado River at Lee's Ferry, AZ

TABLE E-2

CALCULATED PRESENT AND FUTURE FLOW IN THE UPPER OHIO AND UPPER TENNESSEE RIVER BASINS, CONTAINING THE NORTHERN, CENTRAL, AND SOUTHERN APPALACHIAN COAL REGIONS

PERIOD	TOTAL STREAM FLOW (b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS (c)	CALCULATED FLOW (d)	CONSUMPTIVE REQUIREMENTS (c)	CALCULATED FLOW (d)		CONSUMPTIVE REQUIREMENTS (c)	CALCULATED FLOW (d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	11,700	3,530	128	11,600	186	11,500	3,340	307	11,400	3,200
February	13,900	5,850	127	13,800	186	13,700	5,660	305	13,600	3,540
March	16,000	7,450	130	15,800	189	15,800	7,260	309	15,700	7,140
April	13,000	6,690	131	12,900	188	12,800	6,500	307	12,700	6,380
May	9,090	4,200	135	8,960	194	8,900	4,010	319	8,780	3,880
June	6,550	3,090	140	6,410	199	6,350	2,890	320	6,230	2,770
July	4,740	2,430	143	4,600	206	4,540	2,220	331	4,410	2,100
August	4,160	2,050	143	4,020	205	3,960	1,840	332	3,830	1,720
September	3,350	1,720	135	3,220	195	3,160	1,520	317	3,040	1,400
October	3,390	1,610	133	3,260	190	3,200	1,420	313	3,080	1,300
November	4,830	1,970	130	4,700	190	4,640	1,780	312	4,520	1,660
December	8,210	2,380	131	8,080	193	8,020	2,190	319	7,890	2,060
Annual(e)	98,800	65,100	1,610	97,200	2,320	96,500	62,800	3,790	95,000	61,300

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 502 and 601.

TABLE E-3

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE UPPER MISSISSIPPI AND OHIO RIVER BASINS, CONTAINING THE EASTERN INTERIOR AND APPALACHIAN COAL REGIONS

PERIOD	1975				1985			2000		
	TOTAL STREAM FLOW (b)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	21,900	5,800	200	21,700	250	21,700	5,550	500	21,400	5,300
February	29,600	11,200	300	29,300	350	29,300	10,900	500	29,100	10,700
March	32,700	15,900	200	32,500	300	32,400	15,600	500	32,200	15,400
April	35,200	21,800	200	35,000	300	34,900	21,500	500	34,700	21,300
May	23,600	12,600	300	23,300	400	23,200	12,200	600	23,000	12,000
June	18,500	10,100	300	18,200	400	18,100	9,690	650	17,900	9,440
July	13,600	6,760	400	13,200	500	13,100	6,260	900	12,700	5,860
August	7,990	4,120	320	7,670	470	7,520	3,650	910	7,080	3,210
September	6,890	3,960	280	6,610	380	6,510	3,580	750	6,140	3,210
October	6,920	2,450	250	6,670	340	6,580	2,110	530	6,390	1,920
November	9,580	2,640	240	9,340	330	9,250	2,310	530	9,050	2,110
December	13,500	3,970	250	13,280	350	13,200	3,620	550	13,000	3,420
Annual(e)	219,000	126,000	3,220	216,000	4,400	214,000	121,000	7,500	211,000	118,000

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 505 plus 705 minus 507, 602, and 1011.

TABLE E-4

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE MISSOURI AND ARKANSAS RIVER BASINS, CONTAINING THE WESTERN INTERIOR, POWDER RIVER, FORT UNION, AND DENVER-RATON MESA REGIONS

PERIOD	TOTAL STREAM FLOW (b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	4,360	1,250	170	4,190	200	4,160	1,050	320	4,040	930
February	5,560	1,720	170	5,390	210	5,350	1,510	320	5,240	1,400
March	7,600	2,620	230	7,370	240	7,360	2,380	370	7,230	2,250
April	10,300	3,320	360	9,940	420	9,880	2,900	550	9,750	2,770
May	11,900	4,680	1,300	10,600	1,600	10,300	3,080	1,600	10,300	3,080
June	13,600	6,730	3,500	10,100	4,090	9,510	2,640	4,030	9,570	2,700
July	13,200	9,760	7,500	5,700	9,020	4,180	740	9,760	3,440	0
August	8,720	8,130	6,420	2,300	8,180	539	-50	8,790	-70	-660
September	6,400	4,230	2,650	3,750	3,490	2,910	740	3,560	2,840	670
October	5,220	2,000	690	4,530	800	4,420	1,200	890	4,330	1,110
November	4,740	1,560	210	4,530	260	4,480	1,300	380	4,360	1,180
December	3,860	1,270	170	3,690	210	3,650	1,060	330	3,530	940
Annual(e)	95,600	51,600	23,500	72,100	28,900	66,700	22,700	31,000	64,600	20,600

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 1011 and 1104.

TABLE E-5

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE LOWER RED, SABINE, NECHES, TRINITY, BRAZOS, COLORADO, AND NUECES RIVER BASINS, CONTAINING THE TEXAS COAL REGION

PERIOD	TOTAL STREAM FLOW (b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	4,740	986	250	4,490	280	4,460	706	450	4,290	536
February	6,280	1,370	350	5,930	310	5,970	1,060	510	5,770	860
March	6,290	1,670	610	5,680	460	5,830	1,210	610	5,680	1,060
April	6,990	1,860	1,080	5,910	820	6,170	1,040	960	6,030	900
May	9,610	2,070	1,110	8,500	1,130	8,480	940	1,300	8,310	770
June	6,960	2,170	2,050	4,910	1,930	5,030	240	2,260	4,700	-90
July	4,440	2,130	2,930	1,510	2,590	1,850	-460	2,580	1,860	-450
August	3,150	2,190	4,030	-878	4,030	-879	-1,840	3,060	93	-870
September	3,010	1,370	1,990	1,020	3,890	876	-2,520	1,830	1,180	-460
October	2,510	511	420	2,090	500	2,010	11	670	1,840	-159
November	2,880	535	340	2,540	350	2,530	185	510	2,370	25
December	3,930	642	220	3,710	280	3,650	362	460	3,470	182
Annual(e)	61,500	23,800	15,500	46,000	14,800	46,700	9,040	15,200	46,300	8,640

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 1201, 1202, 1204, 1205, and 1107.

TABLE E-6

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE YELLOWSTONE RIVER BASIN CONTAINING THE POWDER RIVER COAL REGION

PERIOD	TOTAL STREAM FLOW(b)		1975		1985			2000		
	MEAN	95%	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	95%	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	95%
January	309	171	8	310	12	297	159	16	293	155
February	400	194	8	392	12	387	182	15	384	179
March	672	310	9	663	14	658	296	18	654	292
April	636	322	39	597	108	527	214	124	512	198
May	1,280	820	278	997	320	945	490	294	982	526
June	2,850	1,720	497	2,350	744	2,100	973	685	2,160	1,030
July	2,120	1,200	781	1,340	1,030	1,100	165	993	1,130	202
August	962	684	511	451	798	164	-114	826	136	-142
September	551	321	153	398	383	167	-62	370	181	-49
October	504	317	34	470	132	372	185	135	369	182
November	436	297	8	428	14	422	283	18	418	279
December	328	201	8	320	13	315	188	17	311	184
Annual(e)	11,000	7,260	2,340	8,680	3,590	7,430	3,670	3,510	7,510	3,750

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
The basin is ASR 1004.

TABLE E-7

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE UPPER MISSOURI RIVER BASIN, CONTAINING THE FORT UNION AND POWDER RIVER COAL REGIONS

PERIOD	TOTAL STREAM FLOW(b)		1975		1985			2000		
	MEAN	95%	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	95%	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d) MEAN	95%
January	655	309	25	630	34	621	275	50	606	259
February	554	180	25	530	37	518	143	52	502	128
March	819	323	28	791	42	777	281	59	760	264
April	1,400	641	67	1,330	175	1,230	466	209	1,190	432
May	2,060	1,530	538	1,520	695	1,360	831	791	1,270	735
June	2,480	1,720	965	1,520	1,430	1,050	292	1,540	942	182
July	3,500	2,830	1,730	1,770	2,450	1,050	378	2,940	557	-110
August	3,030	2,280	1,080	1,950	1,960	1,060	318	2,400	627	-121
September	2,210	1,490	323	1,880	932	1,270	556	1,200	1,010	292
October	1,770	925	72	1,700	307	1,460	618	344	1,430	581
November	1,500	511	26	1,470	46	1,450	465	67	1,430	444
December	766	376	25	741	37	729	339	53	713	323
Annual(e)	20,800	12,800	4,900	15,900	8,150	12,600	4,660	9,700	11,100	3,100

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
The basin is ASR 1005.

TABLE E-8

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE GREEN RIVER BASIN, CONTAINING THE GREEN RIVER COAL REGION

REGION	TOTAL STREAM FLOW(b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	204	88	12	192	20	183	68	26	178	62
February	250	115	11	239	18	232	97	23	227	92
March	380	123	12	268	20	260	103	25	255	98
April	454	163	23	431	30	424	133	38	416	125
May	896	518	145	751	158	738	360	169	727	349
June	1,210	667	294	914	334	873	333	357	853	310
July	721	442	360	361	370	351	72	405	316	37
August	374	256	169	204	297	77	-41	333	41	-77
September	261	179	75	187	146	115	33	169	92	10
October	215	93	17	198	33	182	60	42	173	51
November	204	105	12	192	23	181	82	29	175	76
December	199	82	12	187	22	177	60	28	171	54
Annual(e)	5,260	3,100	1,140	4,120	1,470	3,790	1,630	1,640	3,620	1,460

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
The basin is ASR 1401.

TABLE E-9

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE UPPER COLORADO MAINSTREM AND GREEN RIVER BASINS, CONTAINING THE UINTA - SOUTH - WESTERN UTAH AND GREEN RIVER - HAMS FORK COAL REGIONS

REGION	TOTAL STREAM FLOW(b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	376	243	16	360	25	351	218	35	341	208
February	434	283	16	418	23	410	260	33	401	250
March	491	312	16	475	24	467	288	35	457	277
April	976	573	30	946	40	936	533	63	913	510
May	2,280	1,690	306	1,970	316	1,960	1,370	350	1,930	1,340
June	2,890	2,080	598	2,300	633	2,260	1,450	671	2,220	1,410
July	1,540	1,120	661	876	660	8,770	460	695	842	425
August	822	649	377	445	509	313	140	540	282	109
September	568	440	168	399	305	262	135	327	241	113
October	445	284	24	422	37	408	247	51	394	233
November	421	305	16	405	28	394	277	39	383	266
December	387	248	16	371	26	361	222	37	351	211
Annual(e)	11,700	6,560	2,250	9,430	2,630	9,050	3,930	2,880	8,800	3,680

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 1401 and 1402.

TABLE E-10

CALCULATED PRESENT AND FUTURE WATER FLOW IN THE UPPER COLORADO RIVER BASIN, CONTAINING THE GREEN RIVER - HAMS FORK, UINTA - SOUTHWESTERN AND SAN JUAN RIVER COAL REGIONS

PERIOD	TOTAL STREAM FLOW(b)		1975		1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)	
	MEAN	95%		MEAN		MEAN	95%		MEAN	95%
January	748	172	21	728	36	712	136	48	700	124
February	778	511	20	758	34	744	477	46	732	465
March	816	379	22	794	37	778	342	50	766	329
April	1,310	247	47	1,260	71	1,240	176	101	1,210	146
May	1,650	536	366	1,290	422	1,230	114	465	1,190	71
June	2,010	863	736	1,270	847	1,160	16	930	1,080	-67
July	1,740	907	792	942	893	842	14	950	785	-43
August	1,420	593	447	970	698	720	-105	746	672	-153
September	1,140	357	206	933	411	729	-54	444	695	-87
October	723	194	31	691	63	659	131	77	646	117
November	791	206	31	770	40	752	166	53	738	153
December	815	184	21	794	39	777	145	52	764	132
Annual(e)	13,900	7,100	2,730	11,200	3,590	10,300	3,510	3.960	9,970	3,170

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
The basin is ASR 1403.

TABLE E-11

CALCULATED PRESENT AND FUTURE WATER FLOW(S) IN THE UPPER ARKANSAS AND UPPER PLATTE RIVER BASINS, CONTAINING THE DENVER-RATON MESA COAL REGION

PERIOD	TOTAL STREAM FLOW (b)		1975			1985			2000		
			CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW(d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)		CONSUMPTIVE REQUIREMENTS(c)	CALCULATED FLOW (d)	
	MEAN	95%		MEAN	95%		MEAN	95%		MEAN	95%
January	122	80	25	97	55	28	94	52	44	78	36
February	139	192	26	114	66	29	110	63	45	94	47
March	141	89	29	113	60	18	123	71	35	106	54
April	138	82	29	108	53	35	103	47	53	85	29
May	352	244	234	118	10	169	183	75	110	242	134
June	1070	905	996	72	-91	778	290	127	662	408	243
July	1450	1380	1550	-103	-172	1480	-35	-100	1650	-203	-270
August	1070	1020	1150	-76	-127	1180	-109	-157	1320	-248	-300
September	430	370	393	37	-23	412	18	-42	468	-38	-98
October	169	113	64	105	49	41	118	72	68	101	45
November	139	96	26	113	70	31	108	65	49	90	47
December	128	92	26	102	66	29	99	63	47	81	45
Annual(d)	5350	5240	4540	805	696	4240	1104	1000	4550	800	690

Note: All flows in 1000s of acre-feet.
Footnotes are presented in Table E-12.
Basins are ASR 1007 and 1102.

TABLE E-12

FOOTNOTES FOR WATER FLOW DATA IN TABLES E-2 THROUGH E-11

(a) Total Stream Flow is an estimate of the stream flow that would be observed without any upstream consumption or groundwater mining, but with evaporation, imports, and exports continuing as at present. It is computed for the discharge point of the aggregated subregion (ASR most closely corresponding to the coal region). The 95% flow represents a low flow that is likely to occur during 5 out of 100 years (or months).

(b) Consumptive surface water requirements are the projected water requirements for all areas upstream of the discharge point(s) of the ASR(s), including estimated increased evaporation from new impoundments and any changes in inter-basin exports. The actual amount of water consumed during a particular year may be less than the indicated requirements due to such factors as insufficient supplies at specific points within the region, unavailability of water of sufficient quality, and operator error or mechanical failure during diversion. Additionally, during periods of below-normal rainfall, irrigation demands could be greater than those projected.

(c) Calculated Flow is the difference between total stream flow and the consumptive requirements for both average and low flow conditions. The calculated flow for 1975 is the estimated current stream flow (as adjusted by the WRC) minus the estimated contribution of groundwater mining. Negative flows indicated water shortages that would have to be borne by water users. Positive flows do not necessarily imply that the water is available for use. The actual availability depends on such factors as minimum in-stream requirements, water quality, and water law as determined by each state and by compacts between the states (see text).

(d) Annual totals may not equal the sum of the individual months due to accumulated round-off error.

SOURCE: Adapted from U. S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--the Second National Water Assessment, Washington, D.C.

TABLE E-13

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER OHIO AND UPPER TENNESSEE RIVER BASINS, CONTAINING THE NORTHERN, CENTRAL, AND SOUTHERN APPALACHIAN COAL REGIONS[a]

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	77	83	93
Steam Electric	274	435	1,170
Manufacturing	819	1,200	1,950
Domestic	302	338	371
Commercial	47	49	54
Minerals	83	115	140
Public Lands	3	6	8
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater[b]	1,610	2,320	3,790

[a]ASRs 501, 502, 503, 504, and 601
[b]Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-14

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER MISSISSIPPI AND OHIO RIVER BASINS, CONTAINING THE EASTERN INTERIOR AND APPALACHIAN COAL REGIONS[a]

(1,000 Acre Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	578	755	915
Steam Electric	496	1,040	2,910
Manufacturing	1,170	1,550	2,500
Domestic	683	745	805
Commercial	138	148	162
Minerals	147	205	252
Public Lands	8	11	17
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater[b]	3,220	4,450	7,560

[a] ASRs 5 (Tot.) minus 507, plus 7 (Tot.)
[b] Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-15

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE MISSOURI AND ARKANSAS RIVER BASINS, CONTAINING THE WESTERN INTERIOR, POWDER RIVER, AND FORT UNION COAL REGIONS[a]

(1,000 Acre-Feet)

Water Requirements Categories	1975	1985	2000
Agriculture	22,000	26,200	26,300
Steam Electric	140	463	1,060
Manufacturing	283	320	504
Domestic	500	541	589
Commercial	128	134	147
Minerals	246	282	342
Public Lands	206	254	336
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater[b]	23,500	28,300	29,300

[a] ASRs 1102, 1103, 1104, 1105, and 10 (Tot.).
[b] Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-16

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE LOWER RED, SABINE, NECHES, TRINITY, BRAZOS, COLORADO, AND NUECES RIVER BASINS, CONTAINING THE TEXAS COAL REGION[a]

(1,000 Acre-Feet)

Water Requirements Categories	1975	1985	2000
Agriculture	13,200	11,400	9,450
Steam Electric	139	373	1,260
Manufacturing	691	1,200	2,270
Domestic	553	619	708
Commercial	130	140	158
Minerals	690	734	786
Public Lands	< 1	3	3
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater[b]	15,400	14,400	14,600

[a]ASRs 12 (Tot.), 1106, and 1107.
[b]Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-17

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE YELLOWSTONE RIVER BASIN CONTAINING THE POWDER RIVER COAL REGION[a]

(1000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	2,335	3,410	3,260
Steam Electric	3	38	57
Manufacturing	12	13	16
Domestic	13	13	13
Commercial	3	3	3
Minerals	30	41	50
Public Lands	36	43	50
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater[b]	2,340	3,560	3,450

(a) ASR 1004.
(b) Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-18

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER MISSOURI RIVER BASIN, CONTAINING THE FORT UNION AND POWDER RIVER COAL REGIONS (a)

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	4,610	7,330	7,250
Steam Electric	12	62	166
Manufacturing	20	21	25
Domestic	46	47	46
Commercial	12	12	12
Minerals	58	80	95
Public Lands	146	195	265
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater (b)	4,900	7,750	7,860

(a) ASRs 1001, 1002, 1003, 1004, and 1005.

(b) Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-19

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE GREEN RIVER BASIN, CONTAINING THE GREEN RIVER COAL REGION (a)

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	1,010	1,110	1,120
Steam Electric	25	54	63
Manufacturing	0	0	0
Domestic	10	10	10
Commercial	1	1	1
Minerals	30	40	78
Public Lands	69	80	86
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater (b)	1,140	1,290	1,360

(a) ASR 1401.

(b) Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy,the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-20

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER COLORADO MAINSTEM AND GREEN RIVER BASINS, CONTAINING THE UINTA AND GREEN RIVER COAL REGIONS (a)

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	2,060	2,220	2,230
Steam Electric	26	54	101
Manufacturing	2	0	1
Domestic	17	17	18
Commercial	2	2	2
Minerals	35	53	108
Public Lands	101	110	117
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater (b)	2,250	2,450	2,570

(a) ASRs 1401 and 1402.

(b) Totals may not agree due to independent round-off.

Source: Adapted from U. S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-21

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER COLORADO MAINSTEM RIVER BASIN, CONTAINING THE SAN JUAN GREEN RIVER AND UINTA COAL REGIONS (a)

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	2,490	3,010	3,110
Steam Electric	43	119	169
Manufacturing	2	1	2
Domestic	28	30	33
Commercial	3	5	5
Minerals	53	81	161
Public Lands	115	134	142
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater (b)	2,730	3,380	3,620

(a) ASR 14 (Tot.).

(b) Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

TABLE E-22

ANNUAL WATER REQUIREMENTS FOR CONSUMPTIVE USE IN THE UPPER PLATTE AND UPPER ARKANSAS RIVER BASINS, CONTAINING THE DENVER-RATON MESA COAL REGION (a)

(1,000 Acre-Feet)

WATER REQUIREMENTS CATEGORIES	1975	1985	2000
Agriculture	4,231	3,956	4,082
Steam Electric	27	90	213
Manufacturing	49	57	97
Domestic	100	112	128
Commercial	30	32	38
Minerals	48	59	68
Public Lands	58	56	64
Fish Hatcheries	0	0	0
Misc. Other	0	0	0
Total (Avg.) Freshwater (b)	4,543	4,362	4,690

(a) ASRS 1007 and 1102.

(b) Totals may not agree due to independent round-off.

Source: Adapted from U.S. Water Resources Council, 1978. Preliminary Review Copy, the Nation's Water Resources--The Second National Water Assessment. Washington, D.C.

APPENDIX F

REGIONAL COAL PRODUCTION AND USE SUMMARIES

TABLE F-1

REGIONAL COAL PRODUCTION AND USE SUMMARY[a]
1976 BASE CASE
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	875.8	437.5	420.3	645.9	413.4	–	–	–	232.5	307.0
Ohio	465.8	167.7	298.1	709.6	581.9	–	–	–	127.7	232.3
Maryland	28.3	1.7	26.6	91.9	48.7	–	–	–	43.2	22.3
West Virginia	407.7	313.9	93.8	182.4	129.5	–	–	–	52.9	133.5
Northern Appalachian TOTAL	1759.6	920.9	838.8	1629.8	1173.5	–	–	–	456.3	695.1
West Virginia	680.7	558.1	122.5	182.4	182.4	–	–	–	–	182.7
Virginia	400.0	264.0	136.0	74.7	74.7	–	–	–	–	91.7
Kentucky	911.4	401.0	510.4	74.2	66.0	–	–	–	8.2	170.9
Tennessee	76.2	32.0	44.2	175.4	173.6	–	–	–	1.8	50.6
Central Appalachian TOTAL	2068.3	1255.1	813.1	506.7	496.7	–	–	–	10.0	495.9
Tennessee	16.7	12.0	4.7	55.5	55.5	–	–	–	–	18.1
Georgia	1.9	–	1.9	150.7	150.7	–	–	–	–	34.2
Alabama	215.4	73.2	142.1	259.8	192.3	–	–	–	67.6	101.1
Southern Appalachian TOTAL	234.0	85.2	148.7	466.0	398.5				67.6	153.4
Iowa	–	–	–	–	–	–	–	–	–	–
Illinois	582.4	308.7	273.7	414.6	385.5	–	–	–	29.0	197.1
Indiana	253.7	5.1	248.6	458.4	334.6	–	–	–	123.8	134.9
Kentucky	258.3	237.8	290.6	199.0	199.0	–	–	–	–	111.6
Eastern Interior TOTAL	1364.4	551.6	812.9	1072.0	919.1	–	–	–	152.8	443.6
Missouri	60.8	–	60.8	228.0	225.7	–	–	–	2.3	61.8
Arkansas	5.3	0.3	5.0	0.3	0.3	–	–	–	–	1.2
Oklahoma	36.4	–	36.4	6.6	6.6	–	–	–	–	6.9
Kansas	5.9	–	5.9	34.8	34.8	–	–	–	–	9.8
Nebraska	–	–	–	22.7	22.7	–	–	–	–	14.8
Iowa	6.2	3.1	3.1	78.9	78.9	–	–	–	–	20.3
Western Interior TOTAL	114.6	3.4	111.2	371.3	369.0	–	–	–	2.3	114.8
Texas	140.6	–	140.6	164.2	157.6	–	–	–	6.6	59.7
Louisiana	–	–	–	–	–	–	–	–	–	–
Arkansas	–	–	–	1.2	1.2	–	–	–	–	1.4
Texas TOTAL	140.6	–	140.6	165.4	158.8	–	–	–	6.6	61.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-1

REGIONAL COAL PRODUCTION AND USE SUMMARY (a)
1976 BASE CASE
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	259.2	-	259.2	13.4	13.4	-	-	-	-	29.6
Wyoming	114.9	-	114.9	48.9	48.9	-	-	-	-	23.1
Powder River TOTAL	374.1	-	374.1	62.3	62.3	-	-	-	-	52.7
Montana	3.1	-	3.1	12.3	12.3	-	-	-	-	4.4
North Dakota	111.0	-	111.0	75.0	75.0	-	-	-	-	28.7
South Dakota	-	-	-	28.6	28.6	-	-	-	-	7.1
Fort Union TOTAL	114.1	-	114.1	115.9	115.9	-	-	-	-	40.2
Wyoming	193.5	-	193.5	48.9	48.9	-	-	-	-	29.8
Colorado	63.4	3.8	59.6	31.0	31.0	-	-	-	-	13.7
Idaho	-	-	-	6.1	6.1	-	-	-	-	2.0
Utah	-	-	-	0.3	0.3	-	-	-	-	0.2
Green River-Hams Fork TOTAL	256.9	3.8	253.1	86.3	86.3	-	-	-	-	45.7
Colorado	8.1	7.3	.8	52.0	41.1	-	-	-	10.9	17.6
New Mexico	10.5	7.3	3.2	0.2	0.2	-	-	-	-	2.7
Denver-Raton Mesa TOTAL	18.6	14.6	4.0	52.2	41.3	-	-	-	10.9	20.3
Colorado	21.8	21.8	-	5.0	5.0	-	-	-	-	5.2
Utah	79.7	79.7	-	44.1	24.7	-	-	-	19.4	25.8
Uinta - Southwestern Utah TOTAL	101.5	101.5	-	49.1	29.7	-	-	-	19.4	31.0
New Mexico	87.1	-	87.1	80.8	80.8	-	-	-	-	27.4
Colorado	1.2	0.2	1.0	4.0	4.0	-	-	-	-	1.0
Utah	-	-	-	0.5	0.5	-	-	-	-	0.1
San Juan River TOTAL	88.3	0.2	88.1	85.3	85.3	-	-	-	-	28.5

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-1

REGIONAL COAL PRODUCTION AND USE SUMMARY (a)
1976 BASE CASE
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	104.2	-	104.2	70.7	70.7	-	-	-	-	27.0
California	-	-	-	25.3	6.3	-	-	-	18.9	4.8
Nevada	-	-	-	51.6	51.6	-	-	-	-	11.5
Oregon/Washington	-	-	-	49.4	49.4	-	-	-	-	10.8
Other West SUBTOTAL	104.2	-	104.2	197.0	178.0	-	-	-	18.9	54.1
Connecticut/Rhode Island/Massachusetts	-	-	-	0.9	0.9	-	-	-	-	0.3
Delaware/New Jersey	-	-	-	32.8	32.8	-	-	-	-	7.5
Florida	-	-	-	61.1	61.1	-	-	-	-	13.8
Maine/New Hampshire/ Vermont	-	-	-	8.4	8.4	-	-	-	-	1.9
Michigan	-	-	-	298.1	253.3	-	-	-	44.7	62.4
Minnesota/Wisconsin	-	-	-	258.9	248.6	-	-	-	10.4	58.1
Mississippi	-	-	-	16.7	16.7	-	-	-	-	3.9
New York	-	-	-	135.6	84.1	-	-	-	51.5	26.4
North Carolina/ South Carolina	-	-	-	279.8	279.8	-	-	-	-	62.3
Other East SUBTOTAL	-	-	-	1092.3	985.7	-	-	-	106.6	236.6
OTHER U.S. - TOTALS	104.2	-	104.2	1289.3	1163.0	-	-	-	125.5	290.7
EASTERN U.S. TOTALS	5681.5	2816.2	2865.3	4211.2	3515.6	-	-	-	695.6	1963.9
WESTERN U.S. TOTALS	953.5	120.1	833.4	451.1	420.8	-	-	-	30.3	218.4
U.S. TOTALS	6739.2	2936.3	3802.9	5951.6	5100.0	-	-	-	851.4	2473.0

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-2

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,294.0	918.7	375.3	.821.0	501.6	- -	- -	- -	319.4	466.7
Ohio	420.0	239.4	180.6	729.0	577.4	- -	- -	- -	151.6	243.1
Maryland	33.0	22.4	10.6	103.0	53.7	- -	- -	- -	49.3	28.6
West Virginia	369.0	287.8	81.2	176.0	111.6	- -	- -	- -	64.4	123.9
Northern Appalachian TOTAL	2,116.0	1,468.3	647.7	1,829.0	1,244.3	- -	- -	- -	584.7	862.3
West Virginia	907.0	707.5	199.5	201.0	201.0	- -	- -	- -	- -	233.3
Virginia	216.0	155.5	60.5	136.0	136.0	- -	- -	- -	- -	74.4
Kentucky	909.0	609.0	300.0	83.0	83.0	- -	- -	- -	- -	191.4
Tennessee	12.0	5.0	7.0	140.0	138.6	- -	- -	- -	1.4	33.0
Central Appalachian TOTAL	2,044.0	1,477.0	567.0	560.0	558.6	- -	- -	- -	1.4	532.1
Tennessee	16.0	4.6	11.4	73.0	73.0	- -	- -	- -	- -	22.4
Georgia	- -	- -	- -	466.0	466.0	- -	- -	- -	- -	103.5
Alabama	250.0	135.0	115.0	500.0	425.0	- -	- -	- -	75.0	168.6
Southern Appalachian TOTAL	266.0	139.6	126.4	1,039.0	964.0	- -	- -	- -	75.0	294.5
Iowa	- -	- -	- -	74.0	74.0	- -	- -	- -	- -	16.2
Illinois	1,278.0	1,009.6	268.4	469.0	417.4	- -	12.2	- -	39.4	350.0
Indiana	350.0	171.5	178.5	656.0	495.9	- -	- -	- -	160.1	201.5
Kentucky	469.0	253.3	215.7	342.0	315.7	- -	- -	11.6	14.7	153.5
Eastern Interior TOTAL	2,097.0	1,434.4	662.6	1,541.0	1,303.0	- -	12.2	11.6	214.2	721.2
Missouri	74.0	28.1	45.8	291.0	291.0	- -	- -	- -	- -	80.5
Arkansas	13.0	8.3	4.7	368.0	368.0	- -	- -	- -	- -	82.9
Oklahoma	27.0	6.5	20.5	25.0	25.0	- -	- -	- -	- -	10.0
Kansas	7.0	- -	7.0	19.0	19.0	- -	- -	- -	- -	8.0
Nebraska	- -	- -	- -	201.0	201.0	- -	- -	- -	- -	60.4
Iowa	15.0	9.0	6.0	122.0	119.3	- -	- -	- -	2.7	32.2
Western Interior TOTAL	136.0	51.9	84.0	1,026.0	1,023.3	- -	- -	- -	2.7	274.0
Texas	663.0	- -	663.0	1,228.0	1,194.8	- -	17.2	- -	16.0	343.6
Louisiana	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.5
Arkansas	- -	- -	- -	144.0	144.0	- -	- -	- -	- -	33.3
Texas TOTAL	663.0	- -	663.0	1,383.0	1,349.8	- -	17.2	- -	16.0	379.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-2

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL (a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	866.0	- -	866.0	127.0	127.0	- -	- -	- -	- -	111.5
Wyoming	1,184.0	- -	1,184.0	39.0	39.0	- -	- -	- -	- -	115.2
Powder River TOTAL	2,050.0	- -	2,050.0	166.0	166.0	- -	- -	- -	- -	226.7
Montana	5.0	- -	5.0	7.0	7.0	- -	- -	- -	- -	4.4
North Dakota	295.0	- -	295.0	145.0	57.0	88.0	- -	- -	- -	54.7
South Dakota	19.0	- -	19.0	69.0	69.0	- -	- -	- -	- -	17.2
Fort Union TOTAL	319.0	- -	319.0	221.0	133.0	88.0	- -	- -	- -	76.3
Wyoming	651.0	- -	651.0	29.0	29.0	- -	- -	- -	- -	65.9
Colorado	149.0	38.7	110.3	1.0	1.0	- -	- -	- -	- -	19.8
Idaho	- -	- -	- -	145.0	145.0	- -	- -	- -	- -	32.8
Utah	- -	- -	- -	10.0	10.0	- -	- -	- -	- -	2.4
Green River-Hams Fork TOTAL	800.0	38.7	761.3	185.0	185.0	- -	- -	- -	- -	120.9
Colorado	33.0	11.2	21.8	197.0	180.5	- -	- -	- -	16.5	55.5
New Mexico	17.0	17.0	- -	14.0	14.0	- -	- -	- -	- -	8.0
Denver-Raton Mesa TOTAL	50.0	28.2	21.8	211.0	194.5	- -	- -	- -	16.5	63.5
Colorado	49.0	28.4	21.1	2.0	2.0	- -	- -	- -	- -	8.0
Utah	251.0	223.4	27.6	181.0	169.1	- -	- -	- -	11.9	88.6
Uinta-Southwestern Utah TOTAL	300.0	251.8	48.7	183.0	171.1	- -	- -	- -	11.9	96.6
New Mexico	230.0	4.6	225.4	80.0	80.0	- -	- -	- -	- -	42.5
Colorado	20.0	9.0	11.0	1.0	1.0	- -	- -	- -	- -	3.1
Utah	- -	- -	- -	8.0	8.0	- -	- -	- -	- -	1.8
San Juan River TOTAL	250.0	13.6	236.4	89.0	89.0	- -	- -	- -	- -	47.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-2

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL (a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	30.0	- -	30.0	201.0	125.4	75.6	- -	- -	- -	44.7
California	- -	- -	- -	70.0	51.0	- -	- -	- -	18.9	14.9
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.8
Oregon/Washington	- -	- -	- -	51.0	51.0	- -	- -	- -	- -	11.3
Other West SUBTOTAL	30.0	- -	30.0	333.0	238.4	75.6	- -	- -	18.9	73.7
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	101.0	101.0	- -	- -	- -	- -	22.9
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	349.0	292.8	- -	- -	- -	56.2	73.0
Minnesota/Wisconsin	- -	- -	- -	441.0	386.8	- -	- -	- -	54.2	96.5
Mississippi	- -	- -	- -	18.0	18.0	- -	- -	- -	- -	4.4
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.0	346.0	- -	- -	- -	- -	77.6
Other East SUBTOTAL	- -	- -	- -	1,561.0	1,355.9	- -	- -	- -	205.1	336.0
OTHER U.S. - TOTALS	30.0	- -	30.0	1,894.0	1,594.3	75.6	- -	- -	224.0	409.7
EASTERN U.S. TOTALS	7,322.0	4,571.2	2,750.7	7,378.0	6,443.0	- -	29.4	11.6	894.0	3,063.5
WESTERN U.S. TOTALS	3,769.0	332.3	3,437.2	1,055.0	938.6	88.0	- -	- -	28.4	631.4
U.S. TOTALS	11,121.0	9,903.5	6,217.9	10,327.0	8,975.9	163.6	29.4	11.6	1,146.4	4,104.6

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-3

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,137.0	858.8	284.2	884.0	591.4	- -	19.4	- -	273.2	463.4
Ohio	341.0	245.5	95.5	870.0	656.0	- -	53.1	- -	160.9	265.7
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.1
West Virginia	636.0	572.4	63.6	240.0	166.3	- -	- -	- -	73.4	210.9
Northern Appalachian TOTAL	2,201.0	1,736.8	464.2	2,103.0	1,480.2	- -	72.5	- -	550.0	983.1
West Virginia	821.0	673.2	147.8	133.0	133.0	- -	- -	- -	- -	206.4
Virginia	309.0	234.8	74.2	147.0	147.0	- -	- -	- -	- -	96.8
Kentucky	925.0	684.5	240.5	108.0	108.0	- -	- -	- -	- -	208.3
Tennessee	7.0	3.9	3.1	459.0	457.6	- -	- -	- -	1.4	102.1
Central Appalachian TOTAL	2,062.0	1,596.4	465.6	847.0	845.6	- -	- -	- -	1.4	613.6
Tennessee	4.0	2.0	2.0	91.0	89.7	- -	- -	- -	1.3	25.4
Georgia	- -	- -	- -	589.0	589.4	- -	- -	- -	- -	130.1
Alabama	250.0	162.5	87.5	500.0	398.5	- -	11.0	- -	90.5	172.8
Southern Appalachian TOTAL	254.0	164.5	89.5	1,180.0	1,077.2	- -	11.0	- -	91.8	328.3
Iowa	- -	- -	- -	29.0	28.5	- -	- -	- -	0.5	6.3
Illinois	2,307.0	2,076.3	230.7	510.0	442.2	- -	25.5	- -	42.3	567.8
Indiana	338.0	256.9	81.1	707.0	514.0	- -	22.6	- -	170.4	216.1
Kentucky	552.0	353.3	198.7	498.0	422.8	- -	- -	59.8	15.4	203.9
Eastern Interior TOTAL	3,197.0	2,686.5	510.5	1,744.0	1,407.5	- -	48.1	59.8	228.6	994.1
Missouri	105.0	69.3	35.7	279.0	279.0	- -	- -	- -	- -	85.1
Arkansas	17.0	13.4	3.6	907.0	888.9	- -	18.1	- -	- -	200.2
Oklahoma	33.0	14.8	18.2	53.0	53.0	- -	- -	- -	- -	17.3
Kansas	4.0	- -	4.0	67.0	54.4	- -	12.6	- -	- -	18.2
Nebraska	- -	- -	- -	247.0	247.0	- -	- -	- -	- -	77.1
Iowa	12.0	8.4	3.6	198.0	194.8	- -	- -	- -	3.2	49.8
Western Interior TOTAL	171.0	105.9	65.1	1,751.0	1,717.1	- -	30.7	- -	3.2	447.7
Texas	861.0	- -	861.0	2,281.0	2,249.1	- -	18.2	- -	13.7	598.8
Louisiana	- -	- -	- -	21.0	21.0	- -	- -	- -	- -	4.7
Arkansas	- -	- -	- -	211.0	211.0	- -	- -	- -	- -	48.7
Texas TOTAL	861.0	- -	861.0	2,513.0	2,481.1	- -	18.2	- -	13.7	652.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

. TABLE F-3

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	2,068,0	- -	2,068.0	198.0	112.5	- -	85.5	- -	- -	232.5
Wyoming	1,932.0	- -	1,932.0	78.0	15.8	62.2	- -	- -	- -	186.1
Powder River TOTAL	4,000.0	- -	4,000.0	276.0	128.3	62.2	85.5	- -	- -	418.6
Montana	5.0	- -	5.0	19.0	2.1	- -	16.9	- -	- -	6.9
North Dakota	395.0	- -	395.0	286.0	204.5	81.5	- -	- -	- -	96.1
South Dakota	19.0	- -	19.0	135.0	135.0	- -	- -	- -	- -	32.2
Fort Union TOTAL	419.0	- -	419.0	440.0	341.6	81.5	16.9	- -	- -	135.2
Wyoming	996.0	- -	996.0	92.0	29.7	62.3	- -	- -	- -	106.8
Colorado	204.0	81.6	122.4	1.0	1.0	- -	- -	- -	- -	30.3
Idaho	- -	- -	- -	99.0	99.0	- -	- -	- -	- -	23.3
Utah	- -	- -	- -	9.0	9.0	- -	- -	- -	- -	2.3
Green River-Hams Fork TOTAL	1,200.0	81.6	1,118.4	201.0	137.7	62.3	- -	- -	- -	162.7
Colorado	65.0	31.9	33.6	295.0	270.2	- -	- -	- -	24.8	94.0
New Mexico	35.0	35.0	- -	8.0	8.0	- -	- -	- -	- -	11.1
Denver-Raton Mesa TOTAL	100.0	66.9	33.6	303.0	278.2	- -	- -	- -	24.8	105.1
Colorado	109.0	88.3	20.7	1.0	1.0	- -	- -	- -	- -	24.5
Utah	291.0	256.1	34.9	217.0	191.4	- -	- -	- -	25.8	104.2
Uinta-Southwestern Utah TOTAL	400.0	344.4	55.6	218.0	192.4	- -	- -	- -	25.8	128.7
New Mexico	479.0	4.8	474.2	126.0	69.4	56.6	- -	- -	- -	74.2
Colorado	21.0	12.4	8.6	1.0	1.0	- -	- -	- -	- -	14.4
Utah	- -	- -	- -	9.0	9.0	9.0	- -	- -	- -	2.0
San Juan River TOTAL	500.0	17.2	482.8	136.0	79.4	65.6	- -	- -	- -	90.6

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-3

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PREFERRED PROGRAM ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	107.0	- -	107.0	282.0	208.4	73.9	- -	- -	- -	71.0
California	- -	- -	- -	139.0	111.2	- -	- -	- -	27.8	29.7
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.9
Oregon/Washington	- -	- -	- -	274.0	274.0	- -	- -	- -	- -	60.0
Other West SUBTOTAL	107.0	- -	107.0	706.0	604.6	73.9	- -	- -	27.8	163.3
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	350.0	350.0	- -	- -	- -	- -	77.6
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	539.0	471.1	- -	- -	- -	67.9	113.9
Minnesota/Wisconsin	- -	- -	- -	331.0	310.8	- -	- -	- -	20.2	76.3
Mississippi	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.9
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	213.0	213.0	- -	- -	- -	- -	49.4
Other East SUBTOTAL	- -	- -	- -	2,067.0	1,865.1	- -	- -	- -	201.9	450.3
OTHER U.S. - TOTALS	107.0	- -	107.0	2,773.0	2,469.7	73.9	- -	- -	229.7	613.9
EASTERN U.S. TOTALS	8,746.0	6,290.1	2,455.9	10,138.0	9,008.7	- -	180.5	59.8	888.7	4,019.0
WESTERN U.S. TOTALS	6,619.0	510.1	6,109.4	1,574.0	1,157.6	271.6	102.4	- -	50.6	1,040.9
U.S. TOTALS	15,472.0	6,800.2	8,672.3	14,485.0	12,636.0	345.5	282.9	59.8	1,169.0	5,673.8

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-4

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,295.0	919.4	375.6	821.0	501.6	- -	- -	- -	319.4	467.0
Ohio	421.0	240.0	181.0	729.0	577.4	- -	- -	- -	151.6	243.3
Maryland	33.0	22.4	10.6	103.0	53.7	- -	- -	- -	49.3	28.6
West Virginia	368.0	287.0	81.0	176.0	111.6	- -	- -	- -	64.4	123.7
Northern Appalachian TOTAL	2,117.0	1,468.8	648.2	1,829.0	1,244.3	- -	- -	- -	584.7	862.6
West Virginia	906.0	706.7	199.3	201.0	201.0	- -	- -	- -	- -	233.1
Virginia	212.0	152.6	59.4	136.0	136.0	- -	- -	- -	- -	73.7
Kentucky	925.0	619.8	305.2	85.0	85.0	- -	- -	- -	- -	194.8
Tennessee	12.0	5.0	7.0	142.0	140.6	- -	- -	- -	1.4	33.4
Central Appalachian TOTAL	2,055.0	1,484.1	570.9	564.0	562.6	- -	- -	- -	1.4	535.0
Tennessee	15.0	4.4	10.6	75.0	75.0	- -	- -	- -	- -	22.6
Georgia	- -	- -	- -	469.0	469.0	- -	- -	- -	- -	104.2
Alabama	260.0	140.0	119.6	516.0	438.6	- -	- -	- -	77.4	174.3
Southern Appalachian TOTAL	275.0	144.4	130.2	1,060.0	982.6	- -	- -	- -	77.4	301.1
Iowa	- -	- -	- -	75.0	75.0	- -	- -	- -	- -	16.4
Illinois	1,272.0	1,004.9	267.1	468.0	416.5	- -	12.2	- -	39.3	348.6
Indiana	345.0	169.0	176.0	657.0	496.7	- -	- -	- -	160.3	200.8
Kentucky	444.0	239.8	204.2	344.0	317.5	- -	- -	11.7	14.8	150.1
Eastern Interior TOTAL	2,061.0	1,413.7	647.3	1,544.0	1,305.7	- -	12.2	11.7	214.4	715.9
Missouri	74.0	28.1	45.9	297.0	297.0	- -	- -	- -	- -	81.8
Arkansas	15.0	9.6	5.4	423.0	423.0	- -	- -	- -	- -	95.2
Oklahoma	30.0	7.2	22.8	17.0	17.0	- -	- -	- -	- -	8.6
Kansas	8.0	- -	8.0	18.0	18.0	- -	- -	- -	- -	7.9
Nebraska	- -	- -	- -	195.0	195.0	- -	- -	- -	- -	59.1
Iowa	15.0	9.0	6.0	119.0	116.4	- -	- -	- -	2.6	31.5
Western Interior TOTAL	142.0	53.9	88.1	1,069.0	1,066.4	- -	- -	- -	2.6	284.1
Texas	640.0	- -	640.0	1,208.0	1,175.4	- -	16.9	- -	15.7	337.9
Louisiana	- -	- -	- -	13.0	13.0	- -	- -	- -	- -	2.9
Arkansas	- -	- -	- -	156.0	156.0	- -	- -	- -	- -	35.9
Texas TOTAL	640.0	- -	640.0	1,377.0	1,344.4	- -	16.9	- -	15.7	376.7

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-4

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	648.0	- -	648.0	129.0	129.0	- -	- -	- -	- -	92.1
Wyoming	1,400.0	- -	1,400.0	37.0	37.0	- -	- -	- -	- -	133.5
Powder River TOTAL	2,048.0	- -	2,048.0	166.0	166.0	- -	- -	- -	- -	225.6
Montana	5.0	- -	5.0	7.0	7.0	- -	- -	- -	- -	4.4
North Dakota	295.0	- -	295.0	145.0	57.0	88.0	- -	- -	- -	54.7
South Dakota	19.0	- -	19.0	46.0	46.0	- -	- -	- -	- -	12.2
Fort Union TOTAL	319.0	- -	319.0	198.0	110.0	88.0	- -	- -	- -	71.3
Wyoming	623.0	- -	623.0	28.0	28.0	- -	- -	- -	- -	63.3
Colorado	137.0	35.6	101.4	1.0	1.0	- -	- -	- -	- -	18.2
Idaho	- -	- -	- -	141.0	141.0	- -	- -	- -	- -	32.0
Utah	- -	- -	- -	10.0	10.0	- -	- -	- -	- -	2.4
Green River-Hams Fork TOTAL	760.0	35.6	724.4	180.0	180.0	- -	- -	- -	- -	115.9
Colorado	33.0	11.2	21.8	187.0	171.3	- -	- -	- -	15.7	53.4
New Mexico	17.0	17.0	- -	14.0	14.0	- -	- -	- -	- -	8.0
Denver-Raton Mesa TOTAL	50.0	29.2	21.8	201.0	185.3	- -	- -	- -	15.7	61.4
Colorado	45.0	26.1	18.9	2.0	2.0	- -	- -	- -	- -	7.4
Utah	251.0	223.4	27.6	176.0	164.4	- -	- -	- -	11.6	87.6
Uinta-Southwestern Utah TOTAL	296.0	249.5	46.5	178.0	166.4	- -	- -	- -	11.6	95.0
New Mexico	230.0	4.6	225.4	80.0	80.0	- -	- -	- -	- -	1.8
Colorado	18.0	8.1	9.9	1.0	1.0	- -	- -	- -	- -	2.8
Utah	- -	- -	- -	8.0	8.0	- -	- -	- -	- -	42.5
San Juan River TOTAL	248.0	12.7	235.3	89.0	89.0	- -	- -	- -	- -	47.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-4

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	42.0	- -	42.0	203.0	126.7	76.3	- -	- -	- -	46.3
California	- -	- -	- -	70.0	51.1	- -	- -	- -		14.9
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.8
Oregon/Washington	- -	- -	- -	48.0	48.0	- -	- -	- -	- -	10.6
Other West SUBTOTAL	42.0	- -	42.0	332.0	236.8	76.3	- -	- -		74.6
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	+2.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	102.0	102.0	- -	- -	- -	- -	23.1
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	344.0	288.6	- -	- -	- -		71.9
Minnesota/Wisconsin	- -	- -	- -	429.0	376.2	- -	- -	- -		93.9
Mississippi	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.8
New York	- -	- -	- -	204.0	109.3	- -	- -	- -		38.5
North Carolina/ South Carolina	- -	- -	- -	346.0	346.0	- -	- -	- -	- -	77.6
Other East SUBTOTAL	- -	- -	- -	1,547.0	1,344.1	- -	- -	- -		332.9
OTHER U.S. - TOTALS	42.0	- -	42.0	1,879.0	1,580.9	76.3	- -	- -		407.5
EASTERN U.S. TOTALS	7,290.0	4,564.9	2,724.7	7,443.0	6,506.0	- -	29.1	11.7	896.2	3075.4
WESTERN U.S. TOTALS	3,721.0	327.0	3,395.0	1,012.0	896.7	88.0	- -	- -	27.3	616.3
U.S. TOTALS	11,053.0	4,891.9	6,161.7	10,334.0	8,983.6	164.3	29.1	11.7	1145.3	4099.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-5

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,130.0	849.8	283.3	884.0	591.4	- -	19.5	- -	273.2	462.1
Ohio	341.0	245.5	95.5	868.0	654.5	- -	52.9	- -	160.6	265.1
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.1
West Virginia	636.0	572.4	63.6	240.0	166.3	- -	- -	- -	73.7	210.9
Northern Appalachian TOTAL	2,194.0	1,733.8	463.3	2,101.0	1,478.7	- -	72.4	- -	550.0	981.2
West Virginia	820.0	672.4	147.6	133.0	133.0	- -	- -	- -	- -	206.1
Virginia	310.0	235.6	74.4	147.0	147.0	- -	- -	- -	- -	96.9
Kentucky	974.0	720.8	253.2	108.0	108.0	- -	- -	- -	- -	217.2
Tennessee	8.0	4.5	3.5	459.0	457.6	- -	- -	- -	1.4	102.3
Central Appalachian TOTAL	2,112.4	1,633.3	478.7	847.0	845.6	- -	- -	- -	1.4	622.5
Tennessee	4.0	2.0	2.0	91.0	89.7	- -	- -	- -	1.3	25.3
Georgia	- -	- -	- -	589.0	589.0	- -	- -	- -	- -	131.0
Alabama	260.0	169.0	91.0	500.0	398.5	- -	11.0	- -	90.5	175.1
Southern Appalachian TOTAL	264.0	171.0	93.0	1,180.0	1,077.2	- -	11.0	- -	93.2	331.4
Iowa	- -	- -	- -	29.0	28.5	- -	- -	- -	0.5	6.3
Illinois	2,367.0	2,130.7	236.7	510.0	442.2	- -	25.5	- -	42.3	579.2
Indiana	329.0	250.0	79.0	707.0	514.0	- -	22.6	- -	170.4	214.3
Kentucky	619.0	396.2	222.8	498.0	472.8	- -	- -	59.8	15.4	214.4
Eastern Interior TOTAL	3,315.0	2,776.9	538.5	1,744.0	1,457.5	- -	48.1	59.8	228.6	1,014.2
Missouri	162.0	106.9	55.1	279.0	279.0	- -	- -	- -	- -	92.4
Arkansas	23.0	18.2	4.8	907.0	888.9	- -	18.1	- -	- -	201.1
Oklahoma	50.0	22.5	27.5	53.0	53.0	- -	- -	- -	- -	19.6
Kansas	5.0	- -	5.0	67.0	54.4	- -	12.6	- -	- -	18.3
Nebraska	- -	- -	- -	247.0	247.0	- -	- -	- -	- -	76.8
Iowa	15.0	10.5	4.5	198.0	194.8	- -	- -	- -	3.2	50.2
Western Interior TOTAL	255.0	158.1	96.9	1,751.0	1,717.1	- -	30.7	- -	3.2	458.4
Texas	1,194.0	- -	1,194.0	2,281.0	2,249.1	- -	18.2	- -	13.7	627.4
Louisiana	- -	- -	- -	21.0	21.0	- -	- -	- -	- -	4.7
Arkansas	- -	- -	- -	211.0	211.0	- -	- -	- -	- -	48.7
Texas TOTAL	1,194.0	- -	1,194.0	2,513.0	2,481.1	- -	18.2	- -	13.7	680.8

Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-5

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	1,100.0	- -	1,100.0	198.0	112.5	- -	85.5	- -	- -	144.7
Wyoming	1,950.0	- -	1,950.0	78.0	15.8	62.2	- -	- -	- -	187.6
Powder River TOTAL	3,050.0	- -	3,050.0	276.0	128.3	62.2	85.5	- -	- -	332.3
Montana	7.0	- -	7.0	19.0	2.1	- -	16.9	- -	- -	7.3
North Dakota	484.0	- -	484.0	286.0	204.5	81.5	- -	- -	- -	102.5
South Dakota	19.0	- -	19.0	135.0	135.0	- -	- -	- -	- -	32.2
Fort Union TOTAL	510.0	- -	510.0	440.0	341.6	81.5	16.9	- -	- -	142.0
Wyoming	800.0	- -	800.0	92.0	29.7	62.3	- -	- -	- -	89.8
Colorado	187.0	74.8	112.2	1.0	1.0	- -	- -	- -	- -	27.7
Idaho	- -	- -	- -	99.0	99.0	- -	- -	- -	- -	23.3
Utah	- -	- -	- -	9.0	9.0	- -	- -	- -	- -	2.3
Green River-[illegible] Fork TOTAL	987.0	74.8	912.2	201.0	138.7	62.3	- -	- -	- -	143.1
Colorado	65.0	31.9	33.2	295.0	270.2	- -	- -	- -	24.8	92.9
New Mexico	42.0	42.0	- -	8.0	8.0	- -	- -	- -	- -	12.7
Denver-Raton Mesa TOTAL	107.0	73.9	33.2	303.0	278.2	- -	- -	- -	24.8	105.6
Colorado	100.0	81.0	19.0	1.0	1.0	- -	- -	- -	- -	22.3
Utah	350.0	308.0	42.0	217.0	191.4	- -	- -	- -	25.8	115.0
Uinta-Southwestern Utah TOTAL	450.0	389.0	61.0	218.0	192.4	- -	- -	- -	25.8	137.3
New Mexico	575.0	5.8	569.3	126.0	69.4	56.6	- -	- -	- -	83.7
Colorado	19.0	11.2	7.8	1.0	1.0	- -	- -	- -	- -	13.0
Utah	- -	- -	- -	9.0	9.0	- -	- -	- -	- -	2.0
San Juan River TOTAL	594.0	17.0	577.1	136.0	79.4	56.6	- -	- -	- -	98.7

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-5

REGIONAL COAL PRODUCTION AND USE SUMMARY
NO NEW LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	103.0	- -	103.0	282.0	208.4	73.9	- -	- -	- -	70.6
California	- -	- -	- -	139.0	111.2	- -	- -	- -	27.8	29.7
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.9
Oregon/Washington	- -	- -	- -	274.0	274.0	- -	- -	- -	- -	60.0
Other West SUBTOTAL	103.0	- -	103.0	706.0	604.6	73.9	- -	- -	27.8	163.2
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	350.0	350.0	- -	- -	- -	- -	77.5
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	539.0	471.1	- -	- -	- -	67.9	113.9
Minnesota/Wisconsin	- -	- -	- -	331.0	310.8	- -	- -	- -	20.2	76.3
Mississippi	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.9
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	213.0	213.0	- -	- -	- -	- -	49.4
Other East SUBTOTAL	- -	- -	- -	2,067.0	1,865.1	- -	- -	- -	201.9	450.2
OTHER U.S. - TOTALS	103.0	- -	103.0	2,773.0	2,469.7	73.9	- -	- -	229.7	613.4
EASTERN U.S. TOTALS	9,334.4	6,473.1	2,864.4	10,136.0	9,096.0	- -	180.4	59.8	815.0	4,088.5
WESTERN U.S. TOTALS	5,698.0	554.7	5,143.5	1,574.0	1,158.6	262.6	102.4	- -	50.6	959.0
U.S. TOTALS	15,135.4	7,027.8	8,110.9	14,483.0	12,724.3	336.5	282.8	59.8	1,095.3	5,660.9

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-6

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PRLA's ONLY ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,295.0	- -	1,295.0	821.0	501.6	- -	- -	- -	319.4	467.0
Ohio	421.2	240.1	181.1	729.0	577.4	- -	- -	- -	151.6	243.4
Maryland	33.0	22.4	10.6	13.0	6.8	- -	- -	- -	6.2	11.9
West Virginia	368.4	287.4	81.0	176.0	111.6	- -	- -	- -	64.4	123.8
Northern Appalachian TOTAL	2,117.6	549.9	1,567.7	1,739.0	1,197.4	- -	- -	- -	541.6	846.1
West Virginia	906.0	706.7	199.3	201.0	201.0	- -	- -	- -	- -	233.1
Virginia	213.9	154.0	59.9	136.0	136.0	- -	- -	- -	- -	74.0
Kentucky	924.2	619.2	305.0	83.5	83.5	- -	- -	- -	- -	194.3
Tennessee	11.7	4.9	6.8	140.6	139.2	- -	- -	- -	1.4	33.1
Central Appalachian TOTAL	2,055.8	1,484.8	571.0	561.1	559.7	- -	- -	- -	1.4	534.5
Tennessee	14.9	4.3	10.6	73.6	73.6	- -	- -	- -	- -	22.3
Georgia	- -	- -	- -	466.8	466.8	- -	- -	- -	- -	103.7
Alabama	250.0	135.0	115.0	505.4	429.6	- -	- -	- -	75.8	169.8
Southern Appalachian TOTAL	264.9	139.3	125.6	1,045.8	970.0	- -	- -	- -	75.8	295.8
Iowa	- -	- -	- -	74.3	74.3	- -	- -	- -	- -	16.2
Illinois	1,270.4	1,003.6	266.8	466.7	415.4	- -	12.1	- -	39.2	348.0
Indiana	344.9	169.0	175.9	656.4	496.2	- -	- -	- -	160.2	200.7
Kentucky	444.4	240.0	204.4	342.6	316.2	- -	- -	11.6	14.7	149.9
Eastern Interior TOTAL	2,059.7	1,412.6	647.1	1,540.0	1,302.1	- -	12.1	11.6	214.1	714.8
Missouri	72.7	27.6	45.0	292.3	292.3	- -	- -	- -	- -	80.7
Arkansas	13.0	8.3	4.7	356.0	356.0	- -	- -	- -	- -	80.3
Oklahoma	28.0	6.7	21.3	23.8	23.8	- -	- -	- -	- -	9.8
Kansas	7.9	- -	7.9	18.3	18.3	- -	- -	- -	- -	8.0
Nebraska	- -	- -	- -	199.4	199.4	- -	- -	- -	- -	60.1
Iowa	15.0	9.0	6.0	120.8	118.1	- -	- -	- -	2.7	31.9
Western Interior TOTAL	136.6	51.6	84.9	1,010.6	1,007.9	- -	- -	- -	2.7	270.8
Texas	637.0	- -	637.0	1,218.2	1,185.3	- -	17.1	- -	15.8	339.3
Louisiana	- -	- -	- -	10.5	10.5	- -	- -	- -	- -	2.4
Arkansas	- -	- -	- -	137.4	137.4	- -	- -	- -	- -	31.9
Texas TOTAL	637.0	- -	637.0	1,366.1	1,333.2	- -	17.1	- -	15.8	373.6

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-6

REGIONAL COAL PRODUCTION AND USE SUMMARIES

PRLA's ONLY ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL (a)

(100,000 tons)

(continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	650.0	- -	650.0	128.2	128.2	- -	- -	- -	- -	92.2
Wyoming	1,400.0	- -	1,400.0	37.7	37.7	- -	- -	- -	- -	133.6
Powder River TOTAL	2,050.0	- -	2,050.0	165.9	165.9	- -	- -	- -	- -	225.8
Montana	5.0	- -	5.0	6.9	6.9	- -	- -	- -	- -	4.4
North Dakota	295.0	- -	295.0	145.0	57.0	88.0	- -	- -	- -	54.7
South Dakota	19.0	- -	19.0	69.2	69.2	- -	- -	- -	- -	17.2
Fort Union TOTAL	319.0	- -	319.0	221.1	133.1	88.0	- -	- -	- -	76.3
Wyoming	630.0	- -	630.0	27.5	27.5	- -	- -	- -	- -	63.8
Colorado	149.0	38.7	110.3	1.0	1.0	- -	- -	- -	- -	19.8
Idaho	- -	- -	- -	140.3	140.3	- -	- -	- -	- -	31.8
Utah	- -	- -	- -	9.6	9.6	- -	- -	- -	- -	2.3
Green River-Hams Fork TOTAL	779.0	38.7	740.3	178.4	178.4	- -	- -	- -	- -	117.7
Colorado	33.0	11.2	21.8	196.6	180.1	- -	- -	- -	16.5	55.5
New Mexico	17.0	17.0	- -	13.9	13.9	- -	- -	- -	- -	8.0
Denver-Raton Mesa TOTAL	50.9	28.2	21.8	210.5	194.0	- -	- -	- -	16.5	63.5
Colorado	49.0	28.4	20.6	2.0	2.0	- -	- -	- -	- -	8.0
Utah	251.0	223.4	27.6	176.6	164.9	- -	- -	- -	11.7	87.7
Uinta-Southwestern Utah TOTAL	300.0	251.8	48.2	178.6	166.9	- -	- -	- -	11.7	95.7
New Mexico	230.0	4.6	225.4	79.8	79.8	- -	- -	- -	- -	42.4
Colorado	18.0	8.1	9.9	1.0	1.0	- -	- -	- -	- -	2.8
Utah	- -	- -	- -	7.7	7.7	- -	- -	- -	- -	1.7
San Juan River TOTAL	248.0	12.7	235.3	88.5	88.5	- -	- -	- -	- -	46.9

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-6

REGIONAL COAL PRODUCTION AND USE SUMMARIES

PRLA's ONLY ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL (a)

(100,000 tons)

(concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	37.8	- -	37.8	201.4	125.7	75.7	- -	- -	- -	45.5
California	- -	- -	- -	69.7	50.9	18.8	- -	- -	- -	14.8
Nevada	- -	- -	- -	10.6	10.6	- -	- -	- -	- -	2.7
Oregon/Washington	- -	- -	- -	48.2	48.2	- -	- -	- -	- -	10.7
Other West SUBTOTAL	37.8	- -	37.8	329.9	235.4	94.5	- -	- -	- -	73.7
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	101.6	101.6	- -	- -	- -	- -	23.0
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	344.2	288.2	- -	- -	- -	55.4	72.0
Minnesota/Wisconsin	- -	- -	- -	433.5	380.2	- -	- -	- -	53.3	94.9
Mississippi	- -	- -	- -	18.8	18.8	- -	- -	- -	- -	4.6
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.2	346.2	- -	- -	- -	- -	77.6
Other East SUBTOTAL	- -	- -	- -	1,550.3	1,346.9	- -	- -	- -	203.4	333.7
OTHER U.S. - TOTALS	37.8	- -	37.8	1,880.2	1,582.3	94.5	- -	- -	203.4	407.4
EASTERN U.S. TOTALS	7,271.6	3,638.2	3,633.3	7,262.6	6,370.3	- -	29.2	11.6	851.4	3,035.6
WESTERN U.S. TOTALS	3,746.0	331.4	3,414.6	1,043.0	926.8	88.0	- -	- -	28.2	625.9
U.S. TOTALS	11,055.4	3,969.6	7,085.7	10,185.8	8,879.4	182.5	29.2	11.6	1,083.0	4,068.9

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-7

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PRLA's ONLY ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,130.7	848.0	282.7	884.1	591.5	- -	19.4	- -	273.2	461.7
Ohio	341.0	245.5	95.5	868.0	654.5	- -	52.9	- -	160.6	265.1
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.1
West Virginia	635.3	571.8	63.5	240.0	166.3	- -	- -	- -	73.7	210.7
Northern Appalachian TOTAL	2,194.0	1,731.4	462.6	2,101.1	1,478.8	- -	72.3	- -	550.0	980.6
West Virginia	819.7	672.2	147.5	133.0	133.0	- -	- -	- -	- -	206.0
Virginia	308.6	234.5	74.1	147.0	147.0	- -	- -	- -	- -	96.6
Kentucky	969.2	717.2	252.0	108.0	108.0	- -	- -	- -	- -	216.3
Tennessee	7.6	4.3	3.3	474.8	473.4	- -	- -	- -	1.4	105.7
Central Appalachian TOTAL	2,104.9	1,628.2	476.9	862.8	861.4	- -	- -	- -	1.4	624.6
Tennessee	3.4	1.7	1.7	91.2	89.9	- -	- -	- -	1.3	25.3
Georgia	- -	- -	- -	593.4	593.4	- -	- -	- -	- -	132.0
Alabama	260.0	169.0	91.0	507.5	404.5	- -	11.1	- -	91.9	176.7
Southern Appalachian TOTAL	263.4	170.7	92.7	1,192.1	1,087.8	- -	11.1	- -	93.2	334.0
Iowa	- -	- -	- -	28.7	28.2	- -	- -	- -	0.5	6.3
Illinois	2,205.0	1,984.5	220.5	511.3	443.3	- -	25.6	- -	42.4	548.3
Indiana	330.4	251.1	79.3	707.3	514.2	- -	22.6	- -	170.5	214.7
Kentucky	609.0	389.8	219.2	499.5	424.1	- -	- -	59.9	15.5	213.2
Eastern Interior TOTAL	3,144.4	2,625.4	519.0	1,746.8	1,409.8	- -	48.2	59.9	228.9	982.5
Missouri	112.5	74.2	38.8	274.0	274.0	- -	- -	- -	- -	84.9
Arkansas	21.0	16.6	4.4	879.5	861.9	- -	17.6	- -	- -	194.8
Oklahoma	45.0	20.2	24.8	50.6	50.6	- -	- -	- -	- -	18.4
Kansas	5.1	- -	5.1	66.4	53.9	- -	12.5	- -	- -	18.2
Nebraska	- -	- -	- -	244.7	244.7	- -	- -	- -	- -	76.4
Iowa	9.2	6.4	2.8	196.2	193.1	- -	- -	- -	3.1	49.0
Western Interior TOTAL	192.8	117.4	75.9	1,711.4	1,678.2	- -	30.1	- -	3.1	441.7
Texas	1,164.1	- -	1,164.1	2,248.0	2,216.5	- -	18.0	- -	13.5	617.7
Louisiana	- -	- -	- -	21.0	21.0	- -	- -	- -	- -	4.7
Arkansas	- -	- -	- -	203.3	203.3	- -	- -	- -	- -	47.0
Texas TOTAL	1,164.1	- -	1,164.1	2,472.3	2,440.8	- -	18.0	- -	13.5	669.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-7

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PRLA's ONLY ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	1,100.0	- -	1,100.0	202.2	114.8	- -	87.4	- -	- -	145.5
Wyoming	2,450.0	- -	2,450.0	70.2	14.2	55.9	- -	- -	- -	229.6
Powder River TOTAL	3,550.0	- -	3,550.0	272.4	129.0	55.9	87.4	- -	- -	375.1
Montana	5.0	- -	5.0	17.5	2.0	- -	15.5	- -	- -	6.6
North Dakota	450.0	- -	450.0	282.0	201.6	80.4	- -	- -	- -	99.2
South Dakota	19.0	- -	19.0	146.4	146.4	- -	- -	- -	- -	34.7
Fort Union TOTAL	474.0	- -	474.0	445.9	350.0	80.4	15.5	- -	- -	140.5
Wyoming	805.0	- -	805.0	84.7	27.4	57.3	- -	- -	- -	89.0
Colorado	205.0	82.0	123.0	- -	- -	- -	- -	- -	- -	30.2
Idaho	- -	- -	- -	91.2	91.2	- -	- -	- -	- -	21.6
Utah	- -	- -	- -	8.1	8.1	- -	- -	- -	- -	2.1
Green River-Hams Fork TOTAL	1,010.0	82.0	928.0	184.0	99.3	57.3	- -	- -	- -	142.9
Colorado	65.0	31.8	33.2	287.5	263.4	- -	- -	- -	24.1	93.4
New Mexico	40.0	40.0	- -	8.1	8.1	- -	- -	- -	- -	12.2
Denver-Raton Mesa TOTAL	105.0	71.8	33.2	295.6	271.5	- -	- -	- -	24.1	105.6
Colorado	120.0	97.2	22.8	- -	- -	- -	- -	- -	- -	25.5
Utah	300.0	264.0	36.0	205.3	181.1	- -	- -	- -	24.4	103.4
Uinta-Southwestern Utah TOTAL	420.0	361.2	58.8	205.3	181.1	- -	- -	- -	24.4	128.9
New Mexico	530.0	5.3	524.7	127.4	70.2	70.2	- -	- -	- -	79.5
Colorado	19.0	11.2	7.8	- -	- -	- -	- -	- -	- -	14.1
Utah	- -	- -	- -	8.1	8.1	- -	- -	- -	- -	1.8
San Juan River TOTAL	549.0	16.5	532.5	135.5	78.3	70.2	- -	- -	- -	95.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-7

REGIONAL COAL PRODUCTION AND USE SUMMARIES
PRLA's ONLY ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	86.2	- -	86.2	285.0	210.6	74.7	- -	- -	- -	69.6
California	- -	- -	- -	138.9	111.1	- -	- -	- -	27.8	29.7
Nevada	- -	- -	- -	10.8	10.8	- -	- -	- -	- -	2.9
Oregon/Washington	- -	- -	- -	228.4	228.4	- -	- -	- -	- -	50.0
Other West SUBTOTAL	86.2	- -	86.2	663.1	560.9	74.7	- -	- -	27.8	152.2
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.3
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	350.9	350.9	- -	- -	- -	- -	77.7
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	505.9	442.2	- -	- -	- -	63.7	106.9
Minnesota/Wisconsin	- -	- -	- -	328.5	308.5	- -	- -	- -	20.0	75.7
Mississippi	- -	- -	- -	24.3	24.3	- -	- -	- -	- -	6.0
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	213.0	213.0	- -	- -	- -	- -	49.4
Other East SUBTOTAL	- -	- -	- -	2,032.6	1,835.1	- -	- -	- -	197.5	442.8
OTHER U.S. - TOTALS	86.2	- -	86.2	2,695.7	2,396.0	74.7	- -	- -	225.3	595.0
EASTERN U.S. TOTALS	9,063.6	6,273.1	2,791.2	10,068.5	8,956.8	- -	179.7	59.9	890.1	4,032.8
WESTERN U.S. TOTALS	6,108.0	531.5	5,576.5	1,538.7	1,109.2	263.8	102.9	- -	48.5	988.4
U.S. TOTALS	15,257.8	6,804.6	8,453.9	14,302.9	12,462.0	338.5	282.6	59.9	1,163.9	5,616.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-8

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,294.7	919.2	375.5	821.0	501.6	- -	- -	- -	319.4	467.0
Ohio	420.8	239.9	180.9	729.0	577.4	- -	- -	- -	151.6	243.3
Maryland	33.0	22.4	10.6	13.0	6.8	- -	- -	- -	6.2	11.9
West Virginia	368.2	287.2	81.0	176.0	111.6	- -	- -	- -	64.4	123.8
Northern Appalachian TOTAL	2,116.7	1,468.7	648.0	1,739.0	1,197.4	- -	- -	- -	541.6	846.0
West Virginia	905.9	706.6	199.3	201.0	201.0	- -	- -	- -	- -	233.1
Virginia	212.5	153.0	59.5	136.0	136.0	- -	- -	- -	- -	73.8
Kentucky	918.4	615.1	303.1	83.3	83.3	- -	- -	- -	- -	193.2
Tennessee	11.7	4.9	6.8	140.4	139.0	- -	- -	- -	1.4	33.0
Central Appalachian TOTAL	2,048.5	1,479.6	568.7	560.7	559.3	- -	- -	- -	1.4	533.1
Tennessee	15.3	4.4	10.9	73.2	73.2	- -	- -	- -	- -	22.3
Georgia	- -	- -	- -	466.0	466.0	- -	- -	- -	- -	103.5
Alabama	260.0	140.4	119.6	503.6	428.1	- -	- -	- -	75.5	171.7
Southern Appalachian TOTAL	275.3	144.8	130.5	1,042.8	967.3	- -	- -	- -	75.5	297.5
Iowa	- -	- -	- -	74.0	74.0	- -	- -	- -	- -	16.2
Illinois	1,272.0	1,005.3	267.2	467.4	416.0	- -	12.2	- -	39.3	348.6
Indiana	346.6	169.6	176.8	656.2	496.1	- -	- -	- -	160.1	201.0
Kentucky	452.1	244.1	208.0	342.3	315.9	- -	- -	11.6	14.7	151.0
Eastern Interior TOTAL	2,070.7	1,419.0	652.0	1,539.9	1,302.0	- -	12.2	11.6	214.1	716.8
Missouri	73.9	28.1	45.8	291.8	291.8	- -	- -	- -	- -	80.7
Arkansas	15.0	9.6	5.4	359.8	359.8	- -	- -	- -	- -	81.4
Oklahoma	30.0	7.2	22.8	24.1	24.1	- -	- -	- -	- -	10.2
Kansas	7.4	- -	7.4	18.6	18.6	- -	- -	- -	- -	7.9
Nebraska	- -	- -	- -	199.9	199.9	- -	- -	- -	- -	60.2
Iowa	15.2	9.1	6.1	121.1	118.4	- -	- -	- -	2.7	32.0
Western Interior TOTAL	141.5	54.0	87.5	1,015.3	1,012.6	- -	- -	- -	2.7	272.4
Texas	645.7	- -	645.7	1,221.0	1,188.0	- -	17.1	- -	15.9	340.7
Louisiana	- -	- -	- -	10.6	10.6	- -	- -	- -	- -	2.4
Arkansas	- -	- -	- -	139.7	139.7	- -	- -	- -	- -	32.4
Texas TOTAL	645.7	- -	645.7	1,371.3	1,338.3	- -	17.1	- -	15.9	375.5

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-8

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	720.0	- -	720.0	127.9	127.9	- -	- -	- -	- -	98.4
Wyoming	1,330.0	- -	1,330.0	38.1	38.1	- -	- -	- -	- -	127.6
Powder River TOTAL	2,050.0	- -	2,050.0	166.0	166.0	- -	- -	- -	- -	226.0
Montana	5.0	- -	5.0	6.9	6.9	- -	- -	- -	- -	4.4
North Dakota	295.0	- -	295.0	145.0	57.0	88.0	- -	- -	- -	54.7
South Dakota	19.0	- -	19.0	69.2	69.2	- -	- -	- -	- -	17.2
Fort Union TOTAL	319.0	- -	319.0	221.1	133.1	88.0	- -	- -	- -	76.3
Wyoming	630.0	- -	630.0	27.9	27.9	- -	- -	- -	- -	63.9
Colorado	140.0	36.4	103.6	1.0	1.0	- -	- -	- -	- -	18.6
Idaho	- -	- -	- -	141.8	141.8	- -	- -	- -	- -	32.1
Utah	- -	- -	- -	9.7	9.7	- -	- -	- -	- -	2.3
Green River-Hams Fork TOTAL	770.0	36.4	733.6	180.4	180.4	- -	- -	- -	- -	116.9
Colorado	33.0	11.2	21.8	196.6	180.1	- -	- -	- -	16.5	55.5
New Mexico	17.0	17.0	- -	13.9	13.9	- -	- -	- -	- -	8.0
Denver-Raton Mesa TOTAL	50.0	28.2	21.8	210.5	194.0	- -	- -	- -	16.5	63.5
Colorado	46.0	26.7	19.3	2.0	2.0	- -	- -	- -	- -	7.5
Utah	251.0	223.4	27.6	178.1	166.3	- -	- -	- -	11.8	88.1
Uinta-Southwestern Utah TOTAL	297.0	250.1	46.9	180.1	168.3	- -	- -	- -	11.8	95.6
New Mexico	230.0	4.6	225.4	79.7	79.7	- -	- -	- -	- -	42.4
Colorado	18.0	8.1	9.9	1.0	1.0	- -	- -	- -	- -	2.8
Utah	- -	- -	- -	7.8	7.8	- -	- -	- -	- -	1.7
San Juan River TOTAL	248.0	12.7	235.3	88.5	88.5	- -	- -	- -	- -	46.9

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-8

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	38.5	- -	38.5	201.3	125.6	75.7	- -	- -	- -	45.6
California	- -	- -	- -	69.7	50.9	- -	- -	- -	18.8	14.8
Nevada	- -	- -	- -	10.7	10.7	- -	- -	- -	- -	2.7
Oregon/Washington	- -	- -	- -	49.3	49.3	- -	- -	- -	- -	10.9
Other West SUBTOTAL	38.5	- -	38.5	331.0	236.5	75.7	- -	- -	18.8	74.0
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	101.4	101.4	- -	- -	- -	- -	23.0
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	345.8	290.1	- -	- -	- -	55.7	72.3
Minnesota/Wisconsin	- -	- -	- -	435.8	382.2	- -	- -	- -	53.6	95.4
Mississippi	- -	- -	- -	18.7	18.7	- -	- -	- -	- -	4.6
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.3	346.3	- -	- -	- -	- -	77.7
Other East SUBTOTAL	- -	- -	- -	1,554.0	1,350.0	- -	- -	- -	204.0	334.6
OTHER U.S. - TOTALS	38.5	- -	38.5	1,885.0	1,586.5	75.7	- -	- -	222.8	408.6
EASTERN U.S. TOTALS	7,298.4	4,566.1	2,732.4	7,269.0	6,376.9	- -	29.3	11.6	851.2	3,041.3
WESTERN U.S. TOTALS	3,733.0	327.4	3,406.6	1,046.6	930.3	88.0	- -	- -	28.3	625.2
U.S. TOTALS	11,069.9	4,893.5	6,177.5	10,200.6	8,893.7	163.7	29.3	11.6	1,102.3	4,075.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-9

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,132.8	849.6	283.2	884.0	591.4	- -	19.4	- -	273.2	462.1
Ohio	341.0	245.5	95.5	868.0	654.5	- -	52.9	- -	160.6	265.1
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.1
West Virginia	635.5	572.0	63.5	240.0	166.3	- -	- -	- -	73.7	210.8
Northern Appalachian TOTAL	2,196.3	1,733.2	463.1	2,101.0	1,478.7	- -	72.3	- -	550.0	981.1
West Virginia	819.6	672.1	147.5	133.0	133.0	- -	- -	- -	- -	206.0
Virginia	309.5	235.2	74.3	147.0	147.0	- -	- -	- -	- -	96.8
Kentucky	963.5	713.0	250.5	108.0	108.0	- -	- -	- -	- -	215.2
Tennessee	7.6	4.3	3.3	459.5	458.1	- -	- -	- -	1.4	102.3
Central Appalachian TOTAL	2,100.2	1,624.5	475.6	847.5	846.1	- -	- -	- -	1.4	620.3
Tennessee	3.7	1.8	1.9	91.0	89.7	- -	- -	- -	1.3	25.3
Georgia	- -	- -	- -	589.4	589.4	- -	- -	- -	- -	131.1
Alabama	260.0	169.0	91.0	500.7	399.1	- -	11.0	- -	90.6	175.2
Southern Appalachian TOTAL	263.7	170.7	92.9	1,181.1	1,078.2	- -	11.0	- -	91.9	331.6
Iowa	- -	- -	- -	28.2	27.7	- -	- -	- -	0.5	6.2
Illinois	2,350.9	2,115.8	235.1	505.3	438.1	- -	25.3	- -	41.9	575.1
Indiana	329.6	250.5	79.1	703.3	511.3	- -	22.5	- -	169.5	213.7
Kentucky	599.8	383.9	215.9	498.2	423.0	- -	- -	59.8	15.4	211.4
Eastern Interior TOTAL	3,280.3	2,750.2	530.1	1,735.0	1,400.1	- -	47.8	59.8	227.3	1,006.4
Missouri	149.2	98.5	50.7	275.0	275.0	- -	- -	- -	- -	89.8
Arkansas	22.0	17.4	4.6	886.8	869.1	- -	17.7	- -	- -	196.5
Oklahoma	52.0	23.4	28.6	51.0	51.0	- -	- -	- -	- -	19.5
Kansas	4.7	- -	4.7	65.2	52.9	- -	12.3	- -	- -	17.9
Nebraska	- -	- -	- -	240.2	240.2	- -	- -	- -	- -	75.3
Iowa	14.3	10.0	4.3	192.5	189.4	- -	- -	- -	3.1	48.9
Western Interior TOTAL	242.2	149.3	92.9	1,710.7	1,677.6	- -	30.0	- -	3.1	447.9
Texas	1,158.0	- -	1,158.0	2,252.5	2,221.0	- -	18.0	- -	13.5	618.0
Louisiana	- -	- -	- -	21.1	21.1	- -	- -	- -	- -	4.7
Arkansas	- -	- -	- -	205.2	205.2	- -	- -	- -	- -	47.4
Texas TOTAL	1,158.0	- -	1,158.0	2,478.8	2,447.3	- -	18.0	- -	13.5	670.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-9

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	1,199.9	- -	1,199.9	198.4	112.7	- -	85.7	- -	- -	153.8
Wyoming	1,960.0	- -	1,960.0	71.0	14.3	56.6	- -	- -	- -	187.3
Powder River TOTAL	3,159.9	- -	3,159.9	269.4	127.0	56.6	85.7	- -	- -	341.1
Montana	7.0	- -	7.0	17.4	2.0	- -	15.4	- -	- -	6.8
North Dakota	480.0	- -	480.0	279.1	199.6	79.5	- -	- -	- -	100.8
South Dakota	19.0	- -	19.0	152.4	152.4	- -	- -	- -	- -	36.0
Fort Union TOTAL	506.0	- -	506.0	448.9	354.0	79.5	15.4	- -	- -	143.6
Wyoming	850.0	- -	850.0	83.9	27.1	56.8	- -	- -	- -	92.7
Colorado	192.0	76.8	115.2	- -	- -	- -	- -	- -	- -	28.4
Idaho	- -	- -	- -	90.3	90.3	- -	- -	- -	- -	21.4
Utah	- -	- -	- -	8.0	8.0	- -	- -	- -	- -	2.0
Green River-Hams Fork TOTAL	1,042.0	76.8	965.2	182.2	125.4	56.8	- -	- -	- -	144.5
Colorado	65.0	31.9	33.2	289.4	265.1	- -	- -	- -	24.3	92.0
New Mexico	41.0	41.0	- -	8.0	8.0	- -	- -	- -	- -	12.4
Denver-Raton Mesa TOTAL	106.0	72.9	33.2	297.4	273.1	- -	- -	- -	24.3	104.4
Colorado	103.0	83.4	19.6	- -	- -	- -	- -	- -	- -	22.9
Utah	345.0	303.6	41.4	206.6	182.2	- -	- -	- -	24.6	111.9
Uinta-Southwestern Utah TOTAL	448.0	387.0	61.0	206.6	182.2	- -	- -	- -	24.6	134.8
New Mexico	565.0	5.6	559.4	125.9	69.4	56.9	- -	- -	- -	82.7
Colorado	19.0	11.2	7.8	- -	- -	- -	- -	- -	- -	13.3
Utah	- -	- -	- -	8.0	8.0	- -	- -	- -	- -	1.8
San Juan River TOTAL	584.0	16.8	567.2	133.9	77.4	56.9	- -	- -	- -	97.8

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-9

REGIONAL COAL PRODUCTION AND USE SUMMARIES
EMERGENCY LEASING ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	102.3	- -	102.3	281.7	208.2	73.8	- -	- -	- -	70.5
California	- -	- -	- -	137.7	110.2	- -	- -	- -	27.5	29.4
Nevada	- -	- -	- -	10.5	10.5	- -	- -	- -	- -	2.8
Oregon/Washington	- -	- -	- -	233.2	233.2	- -	- -	- -	- -	51.1
Other West SUBTOTAL	102.3	- -	102.3	663.1	562.1	73.8	- -	- -	27.5	153.8
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	349.9	349.9	- -	- -	- -	- -	77.5
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	509.2	445.0	- -	- -	- -	64.2	107.6
Minnesota/Wisconsin	- -	- -	- -	330.5	310.3	- -	- -	- -	20.2	76.1
Mississippi	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.9
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	213.3	213.3	- -	- -	- -	- -	49.4
Other East SUBTOTAL	- -	- -	- -	2,036.9	1,838.7	- -	- -	- -	198.2	442.7
OTHER U.S. - TOTALS	102.3	- -	102.3	2,700.0	2,400.8	73.8	- -	- -	225.7	596.5
EASTERN U.S. TOTALS	9,240.7	6,427.9	2,812.6	10,054.1	8,928.0	- -	179.1	59.8	887.2	4,057.4
WESTERN U.S. TOTALS	5,845.9	553.5	5,292.5	1,538.4	1,139.1	249.8	101.1	- -	48.9	966.2
U.S. TOTALS	15,188.9	6,981.4	8,207.4	14,292.5	12,467.9	323.6	280.2	59.8	1,161.8	5,620.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-10

REGIONAL COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,284.3	911.9	372.4	821.0	501.6	- -	- -	- -	319.4	465.6
Ohio	419.5	239.1	180.4	729.0	577.4	- -	- -	- -	151.6	243.5
Maryland	33.0	22.4	10.6	13.0	6.8	- -	- -	- -	6.2	12.0
West Virginia	367.5	286.7	80.9	176.0	111.6	- -	- -	- -	64.4	123.7
Northern Appalachian TOTAL	2,104.3	1,460.1	644.3	1,739.0	1,197.4	- -	- -	- -	541.6	844.8
West Virginia	899.8	701.8	198.0	201.0	201.0	- -	- -	- -	- -	232.2
Virginia	204.0	146.9	57.1	136.0	136.0	- -	- -	- -	- -	72.3
Kentucky	810.0	542.7	267.3	83.2	83.2	- -	- -	- -	- -	174.1
Tennessee	11.0	4.6	6.4	140.3	138.9	- -	- -	- -	1.4	32.9
Central Appalachian TOTAL	1,924.8	1,396.0	528.8	560.5	559.1	- -	- -	- -	1.4	511.5
Tennessee	15.5	4.5	11.0	73.1	73.1	- -	- -	- -	- -	22.4
Georgia	- -	- -	- -	464.3	464.3	- -	- -	- -	- -	103.2
Alabama	300.0	162.0	138.0	502.8	427.4	- -	- -	- -	75.4	181.0
Southern Appalachian TOTAL	315.5	166.5	149.0	1,040.2	964.8	- -	- -	- -	75.4	306.6
Iowa	- -	- -	- -	76.0	76.0	- -	- -	- -	- -	16.6
Illinois	1,168.5	923.1	245.4	475.7	423.4	- -	12.4	- -	40.0	331.3
Indiana	338.8	166.0	172.8	655.7	495.7	- -	- -	- -	160.0	199.8
Kentucky	453.8	245.1	208.7	342.2	315.9	- -	- -	11.6	14.7	151.6
Eastern Interior TOTAL	1,961.1	1,334.2	626.9	1,549.6	1,311.0	- -	12.4	11.6	214.7	699.3
Missouri	19.7	7.5	12.2	292.8	292.8	- -	- -	- -	- -	74.2
Arkansas	17.0	10.9	6.1	385.2	385.2	- -	- -	- -	- -	87.3
Oklahoma	33.0	7.9	25.1	25.6	25.6	- -	- -	- -	- -	11.0
Kansas	2.2	- -	2.2	19.2	19.2	- -	- -	- -	- -	7.3
Nebraska	- -	- -	- -	205.2	205.2	- -	- -	- -	- -	62.0
Iowa	10.3	6.2	4.1	125.4	122.6	- -	- -	- -	2.8	32.4
Western Interior TOTAL	82.2	32.5	49.7	1,053.4	1,050.6	- -	- -	- -	2.8	274.2
Texas	502.1	- -	502.1	1,196.7	1,164.4	- -	16.8	- -	15.6	323.7
Louisiana	- -	- -	- -	11.3	11.3	- -	- -	- -	- -	2.5
Arkansas	- -	- -	- -	150.6	150.6	- -	- -	- -	- -	34.9
Texas TOTAL	502.1	- -	502.1	1,358.6	1,326.3	- -	16.8	- -	15.6	361.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-10

REGIONAL COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	950.0	- -	950.0	130.1	130.1	- -	- -	- -	- -	120.0
Wyoming	1,300.0	- -	1,300.0	40.4	40.4	- -	- -	- -	- -	125.7
Powder River TOTAL	2,250.0	- -	2,250.0	170.5	170.5	- -	- -	- -	- -	245.7
Montana	5.0	- -	5.0	7.2	7.2	- -	- -	- -	- -	4.5
North Dakota	345.0	- -	345.0	145.0	57.0	88.0	- -	- -	- -	58.7
South Dakota	19.0	- -	19.0	80.8	80.8	- -	- -	- -	- -	19.8
Fort Union TOTAL	369.0	- -	369.0	233.0	145.0	88.0	- -	- -	- -	83.0
Wyoming	971.0	- -	971.0	29.3	29.3	- -	- -	- -	- -	93.8
Colorado	149.0	38.7	110.3	1.0	1.0	- -	- -	- -	- -	19.8
Idaho	- -	- -	- -	150.8	150.8	- -	- -	- -	- -	34.2
Utah	- -	- -	- -	9.7	9.7	- -	- -	- -	- -	2.3
Green River-Hams Fork TOTAL	1,120.0	38.7	1,081.3	190.8	190.8	- -	- -	- -	- -	150.1
Colorado	53.0	18.0	35.0	206.7	189.3	- -	- -	- -	17.4	60.9
New Mexico	7.0	7.0	- -	13.9	13.9	- -	- -	- -	- -	5.8
Denver-Raton Mesa TOTAL	60.0	25.0	35.0	220.6	203.2	- -	- -	- -	17.4	66.7
Colorado	57.0	33.1	23.9	2.0	2.0	- -	- -	- -	- -	9.2
Utah	293.0	260.8	32.2	182.9	170.8	- -	- -	- -	12.1	97.0
Uinta-Southwestern Utah TOTAL	350.0	293.9	56.1	184.9	172.8	- -	- -	- -	12.1	106.2
New Mexico	285.0	5.7	279.3	79.8	79.8	- -	- -	- -	- -	48.0
Colorado	15.0	6.8	8.3	1.0	1.0	- -	- -	- -	- -	2.4
Utah	- -	- -	- -	7.7	7.7	- -	- -	- -	- -	1.7
San Juan River TOTAL	300.0	12.5	287.6	88.5	88.5	- -	- -	- -	- -	52.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-10

REGIONAL COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	68.0	- -	68.0	202.7	126.5	76.2	- -	- -	- -	48.7
California	- -	- -	- -	69.3	50.6	- -	- -	- -	18.7	14.9
Nevada	- -	- -	- -	10.7	10.7	- -	- -	- -	- -	2.7
Oregon/Washington	- -	- -	- -	53.1	53.1	- -	- -	- -	- -	11.7
Other West SUBTOTAL	68.0	- -	68.0	335.8	240.9	76.2	- -	- -	18.7	78.0
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	101.0	101.0	- -	- -	- -	- -	22.9
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	351.0	294.5	- -	- -	- -	56.5	73.4
Minnesota/Wisconsin	- -	- -	- -	453.6	397.8	- -	- -	- -	55.8	99.3
Mississippi	- -	- -	- -	18.7	18.7	- -	- -	- -	- -	4.6
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.5	346.5	- -	- -	- -	- -	- -
Other East SUBTOTAL	- -	- -	- -	1,576.8	1,369.8	- -	- -	- -	207.0	338.7
OTHER U.S. - TOTALS	68.0	- -	68.0	1,912.6	1,610.7	76.2	- -	- -	225.7	417.6
EASTERN U.S. TOTALS	6,890.0	4,389.3	2,500.8	7,301.3	6,409.2	- -	29.2	11.6	851.5	2,997.5
WESTERN U.S. TOTALS	4,449.0	370.1	4,079.0	1,088.3	970.8	88.0	- -	- -	29.5	704.1
U.S. TOTALS	11,507.0	4,759.4	6,647.8	10,302.2	8,990.7	164.2	29.2	11.6	1,106.7	4,119.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-11

COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,115.7	836.8	278.9	884.1	591.5	- -	19.4	- -	273.2	459.2
Ohio	341.0	245.5	95.5	868.0	654.5	- -	52.9	- -	160.6	265.6
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.2
West Virginia	634.3	570.9	63.4	240.0	166.3	- -	- -	- -	73.7	210.6
Northern Appalachian TOTAL	2,178.0	1,719.3	458.7	2,101.1	1,478.8	- -	72.3	- -	550.0	978.6
West Virginia	818.0	670.8	147.2	133.0	133.0	- -	- -	- -	- -	205.9
Virginia	308.5	234.5	74.0	147.0	147.0	- -	- -	- -	- -	96.8
Kentucky	832.8	616.3	216.5	108.0	108.0	- -	- -	- -	- -	191.6
Tennessee	71.0	39.8	31.2	466.2	464.8	- -	- -	- -	1.4	114.5
Central Appalachian TOTAL	2,030.3	1,561.4	468.9	854.2	852.8	- -	- -	- -	1.4	608.8
Tennessee	3.5	1.8	1.7	91.1	89.8	- -	- -	- -	1.3	25.4
Georgia	- -	- -	- -	591.2	591.2	- -	- -	- -	- -	131.6
Alabama	300.0	195.0	105.0	503.7	401.5	- -	11.1	- -	91.2	185.8
Southern Appalachian TOTAL	303.5	196.8	106.7	1,186.0	1,082.5	- -	11.1	- -	92.5	342.8
Iowa	- -	- -	- -	29.7	29.2	- -	- -	- -	0.5	6.5
Illinois	2,104.8	1,894.3	210.5	515.3	446.8	- -	25.8	- -	42.8	530.2
Indiana	317.2	241.1	76.1	703.2	511.2	- -	22.5	- -	169.5	211.7
Kentucky	423.7	271.2	152.5	498.8	423.5	- -	- -	59.9	15.5	184.0
Eastern Interior TOTAL	2,845.7	2,406.6	439.1	1,747.0	1,410.7	- -	48.3	59.9	228.3	932.4
Missouri	22.0	14.5	7.5	283.3	283.3	- -	- -	- -	- -	75.4
Arkansas	23.0	18.2	4.8	940.4	921.6	- -	18.8	- -	- -	208.3
Oklahoma	47.0	21.2	25.8	54.8	54.8	- -	- -	- -	- -	19.6
Kansas	2.0	- -	2.0	68.5	55.6	- -	12.9	- -	- -	18.2
Nebraska	- -	- -	- -	252.4	252.4	- -	- -	- -	- -	78.7
Iowa	8.2	5.7	2.5	202.3	199.1	- -	- -	- -	3.2	50.3
Western Interior TOTAL	102.2	59.6	42.6	1,801.7	1,766.8	- -	31.7	- -	3.2	450.5
Texas	589.3	- -	589.3	2,235.8	2,204.5	- -	17.9	- -	13.4	565.8
Louisiana	- -	- -	- -	22.0	22.0	- -	- -	- -	- -	4.9
Arkansas	- -	- -	- -	219.4	219.4	- -	- -	- -	- -	50.6
Texas TOTAL	589.3	- -	589.3	2,477.2	2,445.9	- -	17.9	- -	13.4	621.3

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-11

COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	2,326.9	- -	2,326.9	200.0	113.6	- -	86.4	- -	- -	256.5
Wyoming	2,173.0	- -	2,173.0	80.3	16.2	64.0	- -	- -	- -	207.5
Powder River TOTAL	4,499.9	- -	4,499.9	280.3	129.8	64.0	86.4	- -	- -	464.0
Montana	5.0	- -	5.0	19.8	2.2	- -	17.6	- -	- -	7.1
North Dakota	495.0	- -	495.0	289.6	207.1	82.5	- -	- -	- -	104.3
South Dakota	19.0	- -	19.0	159.1	159.1	- -	- -	- -	- -	37.5
Fort Union TOTAL	519.0	- -	519.0	468.5	368.4	82.5	17.6	- -	- -	148.9
Wyoming	1,296.0	- -	1,296.0	95.7	30.9	64.8	- -	- -	- -	133.6
Colorado	204.0	81.6	122.4	- -	- -	- -	- -	- -	- -	30.1
Idaho	- -	- -	- -	102.9	102.9	- -	- -	- -	- -	24.2
Utah	- -	- -	- -	8.5	8.5	- -	- -	- -	- -	2.2
Green River-Hams Fork TOTAL	1,500.0	81.6	1,418.4	207.1	142.3	64.8	- -	- -	- -	190.1
Colorado	91.0	44.6	46.4	303.3	277.8	- -	- -	- -	25.5	98.7
New Mexico	9.0	9.0	- -	8.0	8.0	- -	- -	- -	- -	5.4
Denver-Raton Mesa TOTAL	100.0	53.6	46.4	311.3	285.8	- -	- -	- -	25.5	104.1
Colorado	136.0	110.2	25.8	- -	- -	- -	- -	- -	- -	27.2
Utah	364.0	320.3	43.7	220.3	194.3	- -	- -	- -	26.2	118.4
Uinta-Southwestern Utah TOTAL	500.0	430.2	69.5	220.3	194.3	- -	- -	- -	26.2	145.6
New Mexico	582.0	5.8	576.2	126.9	69.9	57.0	- -	- -	- -	84.6
Colorado	18.0	10.6	7.4	- -	- -	- -	- -	- -	- -	13.9
Utah	- -	- -	- -	8.5	8.5	- -	- -	- -	- -	1.9
San Juan River TOTAL	600.0	16.4	583.6	135.4	78.4	57.0	- -	- -	- -	100.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-11

COAL PRODUCTION AND USE SUMMARIES
MEET INDUSTRY NEEDS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	36.8	- -	36.8	284.0	209.6	74.4	- -	- -	- -	64.8
California	- -	- -	- -	137.9	110.3	- -	- -	- -	27.6	29.5
Nevada	- -	- -	- -	11.1	11.1	- -	- -	- -	- -	2.9
Oregon/Washington	- -	- -	- -	287.1	287.1	- -	- -	- -	- -	62.8
Other West SUBTOTAL	36.8	- -	36.8	711.1	609.1	74.4	- -	- -	27.6	160.0
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	350.2	350.2	- -	- -	- -	- -	77.6
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	547.0	478.6	- -	- -	- -	69.0	115.7
Minnesota/Wisconsin	- -	- -	- -	347.0	325.8	- -	- -	- -	21.2	78.9
Mississippi	- -	- -	- -	23.7	23.7	- -	- -	- -	- -	5.9
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	213.0	213.0	- -	- -	- -	- -	94.5
Other East SUBTOTAL	- -	- -	- -	2,090.9	1,887.5	- -	- -	- -	204.0	499.8
OTHER U.S. - TOTALS	36.8	- -	36.8	2,802.0	2,496.6	74.4	- -	- -	231.6	659.8
EASTERN U.S. TOTALS	8,049.0	5,943.7	2,105.3	10,167.2	9,037.5	- -	181.3	59.9	888.8	3,934.4
WESTERN U.S. TOTALS	7,718.9	581.8	7,136.8	1,622.9	1,199.0	268.3	104.0	- -	51.7	1,153.1
U.S. TOTALS	15,804.7	6,525.5	9,278.9	14,592.1	12,733.1	342.7	285.3	59.9	1,172.1	5,747.3

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-12

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL (a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,293.0	918.0	375.0	821.0	501.6	- -	- -	- -	319.4	466.6
Ohio	420.0	239.4	180.6	729.0	577.4	- -	- -	- -	151.6	243.2
Maryland	33.0	22.4	10.6	103.0	53.7	- -	- -	- -	49.3	28.6
West Virginia	369.0	287.8	81.2	176.0	111.6	- -	- -	- -	64.4	123.9
Northern Appalachian TOTAL	2,115.0	1,467.6	647.4	1,829.0	1,244.3	- -	- -	- -	584.7	862.3
West Virginia	910.0	709.8	200.2	201.0	201.0	- -	- -	- -	- -	233.9
Virginia	220.0	158.4	61.6	136.0	136.0	- -	- -	- -	- -	75.2
Kentucky	892.0	597.6	294.4	84.0	84.0	- -	- -	- -	- -	188.6
Tennessee	12.0	5.0	7.0	141.0	139.6	- -	- -	- -	1.4	33.2
Central Appalachian TOTAL	2,034.0	1,470.8	563.2	562.0	560.6	- -	- -	- -	1.4	530.9
Tennessee	7.0	2.0	5.0	48.0	48.0	- -	- -	- -	- -	15.2
Georgia	- -	- -	- -	469.0	469.0	- -	- -	- -	- -	104.2
Alabama	214.0	115.6	98.4	509.0	432.7	- -	- -	- -	76.4	162.3
Southern Appalachian TOTAL	221.0	117.6	103.4	1,026.0	949.7	- -	- -	- -	76.4	281.7
Iowa	- -	- -	- -	22.0	22.0	- -	- -	- -	- -	4.8
Illinois	1,257.0	993.0	264.0	483.0	429.9	- -	12.6	- -	40.6	349.0
Indiana	347.0	170.0	177.0	658.0	497.4	- -	- -	- -	160.6	201.4
Kentucky	430.0	232.2	197.8	343.0	316.6	- -	- -	11.7	14.7	147.8
Eastern Interior TOTAL	2,034.0	1,395.2	638.8	1,506.0	1,265.9	- -	12.6	11.7	215.9	703.0
Missouri	47.0	17.9	29.1	295.0	295.0	- -	- -	- -	- -	78.0
Arkansas	14.0	9.0	5.0	378.0	378.0	- -	- -	- -	- -	85.2
Oklahoma	28.0	6.7	21.3	27.0	27.0	- -	- -	- -	- -	10.5
Kansas	5.0	- -	5.0	55.0	55.0	- -	- -	- -	- -	15.5
Nebraska	- -	- -	- -	203.0	203.0	- -	- -	- -	- -	60.9
Iowa	14.0	8.4	5.6	144.0	140.8	- -	- -	- -	3.2	36.8
Western Interior TOTAL	108.0	42.0	66.0	1,102.0	1,098.8	- -	- -	- -	3.2	286.9
Texas	577.0	- -	577.0	1,219.0	1,188.1	- -	17.1	- -	15.8	334.3
Louisiana	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.5
Arkansas	- -	- -	- -	142.0	142.0	- -	- -	- -	- -	32.9
Texas TOTAL	577.0	- -	577.0	1,372.0	1,341.1	- -	17.1	- -	15.8	369.7

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-12

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	864.0	- -	864.0	124.0	124.0	- -	- -	- -	- -	110.6
Wyoming	1,182.0	- -	1,182.0	39.0	39.0	- -	- -	- -	- -	115.0
Powder River TOTAL	2,046.0	- -	2,046.0	163.0	163.0	- -	- -	- -	- -	225.6
Montana	5.0	- -	5.0	12.0	12.0	- -	- -	- -	- -	5.5
North Dakota	195.0	- -	195.0	145.0	57.0	88.0	- -	- -	- -	47.4
South Dakota	19.0	- -	19.0	46.0	46.0	- -	- -	- -	- -	12.2
Fort Union TOTAL	219.0	- -	219.0	203.0	115.0	88.0	- -	- -	- -	65.1
Wyoming	971.0	- -	971.0	29.0	29.0	- -	- -	- -	- -	93.7
Colorado	149.0	38.7	110.3	1.0	1.0	- -	- -	- -	- -	19.8
Idaho	- -	- -	- -	148.0	148.0	- -	- -	- -	- -	33.5
Utah	- -	- -	- -	10.0	10.0	- -	- -	- -	- -	2.4
Green River-Hams Fork TOTAL	1,120.0	38.7	1,081.3	188.0	188.0	- -	- -	- -	- -	149.4
Colorado	53.0	18.0	35.0	214.0	196.0	- -	- -	- -	18.0	62.1
New Mexico	7.0	7.0	- -	26.0	26.0	- -	- -	- -	- -	8.4
Denver-Raton Mesa TOTAL	60.0	25.0	35.0	240.0	222.0	- -	- -	- -	18.0	70.5
Colorado	43.0	24.9	18.1	2.0	2.0	- -	- -	- -	- -	7.1
Utah	221.0	196.7	24.3	181.0	169.1	- -	- -	- -	11.9	83.1
Uinta-Southwestern Utah TOTAL	264.0	221.6	42.4	183.0	171.1	- -	- -	- -	11.9	90.2
New Mexico	210.0	4.2	205.8	68.0	68.0	- -	- -	- -	- -	37.9
Colorado	11.0	5.0	6.1	1.0	1.0	- -	- -	- -	- -	1.8
Utah	- -	- -	- -	8.0	8.0	- -	- -	- -	- -	1.8
San Juan River TOTAL	221.0	9.2	211.9	77.0	77.0	- -	- -	- -	- -	41.5

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-12

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL[a]
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	66.0	- -	66.0	202.0	126.0	76.0	- -	- -	- -	48.3
California	- -	- -	- -	70.0	51.1	- -	- -	- -	18.9	14.9
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.8
Oregon/Washington	- -	- -	- -	51.0	51.0	- -	- -	- -	- -	11.3
Other West SUBTOTAL	66.0	- -	66.0	334.0	239.1	76.0	- -	- -	18.9	77.3
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	102.0	102.0	- -	- -	- -	- -	23.1
Maine/New Hampshire/ Verment	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	349.0	292.8	- -	- -	- -	56.2	73.0
Minnesota/Wisconsin	- -	- -	- -	435.0	381.5	- -	- -	- -	53.5	95.2
Mississippi	- -	- -	- -	19.0	19.0	- -	- -	- -	- -	4.6
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.0	346.0	- -	- -	- -	- -	77.6
Other East SUBTOTAL	- -	- -	- -	1,555.0	1,352.6	- -	- -	- -	204.4	335.1
OTHER U.S. - TOTALS	66.0	- -	66.0	1,891.0	1,591.7	76.0	- -	- -	223.3	412.4
EASTERN U.S. TOTALS	7,089.0	4,493.2	2,595.8	7,397.0	6,460.4	- -	29.7	11.7	897.4	3.034.5
WESTERN U.S. TOTALS	3,930.0	294.5	3,635.6	1,054.0	936.1	88.0	- -	- -	29.9	642.3
U.S. TOTALS	11,085.0	4,787.7	6,297.4	10,342.0	8,988.2	164.0	29.7	11.7	1,150.6	4,089.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-13

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL (a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,184.0	888.0	296.0	884.0	591.4	- -	19.4	- -	273.2	474.6
Ohio	340.0	244.8	95.2	868.0	654.5	- -	52.9	- -	160.6	265.4
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.2
West Virginia	612.0	550.8	61.2	240.0	166.3	- -	- -	- -	73.7	205.0
Northern Appalachian TOTAL	2,223.0	1,749.7	473.3	2,101.0	1,478.7	- -	72.3	- -	550.0	988.2
West Virginia	824.0	675.7	148.3	133.0	133.0	- -	- -	- -	- -	207.2
Virginia	310.0	235.6	74.4	147.0	147.0	- -	- -	- -	- -	97.1
Kentucky	914.0	676.4	237.6	108.0	108.0	- -	- -	- -	- -	206.6
Tennessee	7.0	3.9	3.1	458.0	456.6	- -	- -	- -	1.4	101.9
Central Appalachian TOTAL	2,055.0	1,591.6	463.4	846.0	844.6	- -	- -	- -	1.4	612.8
Tennessee	7.0	3.5	3.5	91.0	89.7	- -	- -	- -	1.3	26.1
Georgia	- -	- -	- -	589.0	589.0	- -	- -	- -	- -	131.1
Alabama	138.0	89.7	48.3	500.0	398.5	- -	11.0	- -	90.5	145.9
Southern Appalachian TOTAL	145.0	93.2	51.8	1,180.0	1,077.2	- -	11.0	- -	91.8	303.1
Iowa	2.0	0.5	1.5	29.0	28.5	- -	- -	- -	0.5	6.5
Illinois	2,419.0	2,177.1	241.9	512.0	443.9	- -	25.6	- -	42.5	590.1
Indiana	364.0	276.6	87.4	711.0	516.9	- -	22.8	- -	171.4	222.0
Kentucky	340.0	217.6	122.4	498.0	422.8	- -	- -	59.8	15.4	170.5
Eastern Interior TOTAL	3,125.0	2,671.8	453.2	1,750.0	1,412.1	- -	48.4	59.8	229.8	989.1
Missouri	55.0	36.3	18.7	283.0	283.0	- -	- -	- -	- -	79.6
Arkansas	19.0	15.0	4.0	941.0	922.2	- -	18.8	- -	- -	207.9
Oklahoma	15.0	6.8	8.3	55.0	55.0	- -	- -	- -	- -	15.1
Kansas	2.0	- -	2.0	67.0	54.4	- -	12.6	- -	- -	17.9
Nebraska	- -	- -	- -	247.0	247.0	- -	- -	- -	- -	77.5
Iowa	10.0	7.0	3.0	198.0	194.8	- -	- -	- -	3.2	49.6
Western Interior TOTAL	101.0	65.1	36.0	1,791.0	1,756.4	- -	31.4	- -	3.2	447.3
Texas	796.0	- -	796.0	2,258.0	2,226.4	- -	18.1	- -	13.5	588.6
Louisiana	- -	- -	- -	22.0	22.0	- -	- -	- -	- -	4.9
Arkansas	- -	- -	- -	220.0	220.0	- -	- -	- -	- -	50.7
Texas TOTAL	796.0	- -	796.0	2,500.0	2,468.4	- -	18.1	- -	13.5	644.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-13

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	2,048.0	- -	2,048.0	198.0	112.5	- -	85.5	- -	- -	230.8
Wyoming	1,913.0	- -	1,913.0	78.0	15.8	62.2	- -	- -	- -	184.6
Powder River TOTAL	3,961.0	- -	3,961.0	276.0	128.3	62.2	85.5	- -	- -	415.4
Montana	5.0	- -	5.0	19.0	2.1	- -	16.9	- -	- -	7.0
North Dakota	201.0	- -	201.0	285.0	203.8	81.2	- -	- -	- -	81.8
South Dakota	19.0	- -	19.0	90.0	90.0	- -	- -	- -	- -	22.4
Fort Union TOTAL	225.0	- -	225.0	394.0	295.9	81.2	16.9	- -	- -	111.2
Wyoming	1,291.0	- -	1,291.0	92.0	29.7	62.3	- -	- -	- -	132.5
Colorado	204.0	81.6	122.4	1.0	1.0	- -	- -	- -	- -	30.3
Idaho	- -	- -	- -	99.0	99.0	- -	- -	- -	- -	23.3
Utah	- -	- -	- -	9.0	9.0	- -	- -	- -	- -	2.3
Green River-Hams Fork TOTAL	1,495.0	81.6	1,413.4	201.0	138.7	62.3	- -	- -	- -	188.4
Colorado	68.0	33.3	34.7	305.0	279.4	- -	- -	- -	25.6	88.6
New Mexico	7.0	7.0	- -	8.0	8.0	- -	- -	- -	- -	4.9
Denver-Raton Mesa TOTAL	75.0	40.3	34.7	313.0	287.4	- -	- -	- -	25.6	93.5
Colorado	77.0	62.4	14.6	1.0	1.0	- -	- -	- -	- -	13.4
Utah	206.0	181.3	24.7	217.0	191.4	- -	- -	- -	25.8	88.7
Uinta-Southwestern Utah TOTAL	283.0	243.7	39.3	218.0	192.4	- -	- -	- -	25.8	102.1
New Mexico	560.0	5.6	554.4	126.0	69.4	56.6	- -	- -	- -	82.3
Colorado	17.0	10.0	7.0	1.0	1.0	- -	- -	- -	- -	2.9
Utah	- -	- -	- -	9.0	9.0	- -	- -	- -	- -	2.0
San Juan River TOTAL	577.0	15.6	561.4	136.0	79.4	56.6	- -	- -	- -	87.2

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-13

REGIONAL COAL PRODUCTION AND USE SUMMARIES
DOE GOALS ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL (a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	83.0	- -	83.0	282.0	208.4	73.9	- -	- -	- -	66.8
California	- -	- -	- -	140.0	112.0	- -	- -	- -	28.0	29.9
Nevada	- -	- -	- -	12.0	12.0	- -	- -	- -	- -	3.1
Oregon/Washington	- -	- -	- -	274.0	274.0	- -	- -	- -	- -	60.0
Other West SUBTOTAL	83.0	- -	83.0	708.0	606.4	73.9	- -	- -	28.0	159.8
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	350.0	350.0	- -	- -	- -	- -	77.6
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	538.0	470.2	- -	- -	- -	67.8	113.7
Minnesota/Wisconsin	- -	- -	- -	308.0	289.2	- -	- -	- -	18.8	71.5
Mississippi	- -	- -	- -	25.0	25.0	- -	- -	- -	- -	6.1
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	214.0	214.0	- -	- -	- -	- -	49.7
Other East SUBTOTAL	- -	- -	- -	2,045.0	1,844.6	- -	- -	- -	200.4	445.8
OTHER U.S. - TOTALS	83.0	- -	83.0	2,753.0	2,451.0	73.9	- -	- -	228.4	615.6
EASTERN U.S. TOTALS	8,445.0	6,171.4	2,273.7	10,168.0	9,037.4	- -	181.2	59.8	889.7	3,984.7
WESTERN U.S. TOTALS	6,616.0	381.2	6,234.8	1,538.0	1,122.1	262.3	102.4	- -	51.4	997.8
U.S. TOTALS	15,144.0	6,552.6	8,591.5	14,459.0	12,610.5	336.2	283.6	59.8	1,169.5	5,598.1

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-14

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,288.6	914.9	373.7	821.0	501.6	- -	- -	- -	319.4	465.9
Ohio	420.0	239.4	180.8	729.0	577.4	- -	- -	- -	151.6	243.3
Maryland	33.0	22.4	10.6	13.0	6.8	- -	- -	- -	6.2	11.9
West Virginia	369.2	288.0	81.2	176.0	111.6	- -	- -	- -	64.4	124.0
Northern Appalachian TOTAL	2,110.8	1,464.7	646.3	1,739.0	1,197.4	- -	- -	- -	541.6	845.1
West Virginia	909.0	709.0	200.0	201.0	201.0	- -	- -	- -	- -	233.8
Virginia	222.8	160.4	62.3	136.0	136.0	- -	- -	- -	- -	75.7
Kentucky	965.5	646.9	318.6	83.1	83.1	- -	- -	- -	- -	201.7
Tennessee	12.4	5.2	7.2	140.2	138.8	- -	- -	- -	1.4	33.1
Central Appalachian TOTAL	2,109.7	1,521.5	588.1	560.3	558.9	- -	- -	- -	1.4	544.3
Tennessee	15.7	4.6	11.1	73.0	73.0	- -	- -	- -	- -	22.4
Georgia	- -	- -	- -	467.5	467.5	- -	- -	- -	- -	103.9
Alabama	214.0	115.6	98.4	501.9	426.6	- -	- -	- -	75.3	160.8
Southern Appalachian TOTAL	229.7	120.2	109.5	1,042.4	967.1	- -	- -	- -	75.3	287.1
Iowa	- -	- -	- -	71.6	71.6	- -	- -	- -	- -	15.6
Illinois	1,315.0	1,038.9	276.2	465.3	414.1	- -	12.1	- -	39.1	356.2
Indiana	349.5	171.3	178.2	654.9	495.1	- -	- -	- -	159.8	201.3
Kentucky	461.4	249.2	212.2	342.1	315.8	- -	- -	11.6	14.7	152.5
Eastern Interior TOTAL	2,125.9	1,459.4	666.6	1,533.9	1,296.6	- -	12.1	11.6	213.6	725.6
Missouri	87.6	33.3	54.3	291.9	291.9	- -	- -	- -	- -	82.6
Arkansas	14.0	9.0	5.0	360.0	360.0	- -	- -	- -	- -	81.3
Oklahoma	28.0	6.7	21.3	24.4	24.4	- -	- -	- -	- -	10.0
Kansas	8.7	- -	8.7	19.0	19.0	- -	- -	- -	- -	8.3
Nebraska	- -	- -	- -	198.0	198.0	- -	- -	- -	- -	60.0
Iowa	19.9	11.9	8.0	118.7	116.1	- -	- -	- -	2.6	32.2
Western Interior TOTAL	158.2	60.9	97.3	1,012.0	1,009.4	- -	- -	- -	2.6	274.3
Texas	785.7	- -	785.7	1,253.9	1,220.0	- -	17.6	- -	16.3	360.1
Louisiana	- -	- -	- -	10.6	10.6	- -	- -	- -	- -	2.4
Arkansas	- -	- -	- -	142.0	142.0	- -	- -	- -	- -	32.9
Texas TOTAL	785.7	- -	785.7	1,406.5	1,372.6	- -	17.6	- -	16.3	395.4

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-14

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	864.0	- -	864.0	125.0	125.0	- -	- -	- -	- -	110.0
Wyoming	973.0	- -	973.0	38.0	38.0	- -	- -	- -	- -	96.7
Powder River TOTAL	1,837.0	- -	1,837.0	163.0	163.0	- -	- -	- -	- -	207.6
Montana	5.0	- -	5.0	6.6	6.6	- -	- -	- -	- -	4.3
North Dakota	350.0	- -	350.0	145.0	57.0	88.0	- -	- -	- -	58.9
South Dakota	19.0	- -	19.0	82.0	82.0	- -	- -	- -	- -	20.0
Fort Union TOTAL	374.0	- -	374.0	233.6	145.6	88.0	- -	- -	- -	83.2
Wyoming	426.0	- -	426.0	28.7	28.7	- -	- -	- -	- -	46.4
Colorado	149.0	38.7	110.3	1.0	1.0	- -	- -	- -	- -	19.8
Idaho	- -	- -	- -	142.3	142.3	- -	- -	- -	- -	32.3
Utah	- -	- -	- -	9.8	9.8	- -	- -	- -	- -	2.4
Green River-Hams Fork TOTAL	575.0	38.7	536.3	181.8	181.8	- -	- -	- -	- -	100.9
Colorado	53.0	18.0	35.0	185.5	169.9	- -	- -	- -	15.6	56.1
New Mexico	17.0	17.0	- -	13.8	13.8	- -	- -	- -	- -	7.9
Denver-Raton Mesa TOTAL	70.0	35.0	35.0	199.3	183.7	- -	- -	- -	15.6	64.0
Colorado	43.0	24.9	18.1	2.0	2.0	- -	- -	- -	- -	7.1
Utah	251.0	223.4	27.6	181.0	169.1	- -	- -	- -	11.9	88.9
Uinta-Southwestern Utah TOTAL	294.0	248.3	45.7	183.0	171.1	- -	- -	- -	11.9	96.0
New Mexico	309.0	6.2	302.8	79.6	79.6	- -	- -	- -	- -	50.3
Colorado	11.0	5.0	6.1	1.0	1.0	- -	- -	- -	- -	1.8
Utah	- -	- -	- -	7.9	7.9	- -	- -	- -	- -	1.7
San Juan River TOTAL	320.0	11.2	308.9	88.5	88.5	- -	- -	- -	- -	53.8

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-14

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1985 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	18.0	- -	18.0	199.9	124.7	75.2	- -	- -	- -	43.4
California	- -	- -	- -	69.6	50.8	- -	- -	- -	18.8	14.8
Nevada	- -	- -	- -	10.8	10.8	- -	- -	- -	- -	2.7
Oregon/Washington	- -	- -	- -	51.6	51.6	- -	- -	- -	- -	11.4
Other West SUBTOTAL	18.0	- -	18.0	331.9	237.9	75.2	- -	- -	18.8	72.3
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	58.0	58.0	- -	- -	- -	- -	12.9
Delaware/New Jersey	- -	- -	- -	24.0	24.0	- -	- -	- -	- -	5.8
Florida	- -	- -	- -	101.7	101.7	- -	- -	- -	- -	23.0
Maine/New Hampshire/ Vermont	- -	- -	- -	20.0	20.0	- -	- -	- -	- -	4.4
Michigan	- -	- -	- -	349.0	292.8	- -	- -	- -	56.2	73.0
Minnesota/Wisconsin	- -	- -	- -	448.9	393.7	- -	- -	- -	55.2	98.2
Mississippi	- -	- -	- -	18.5	18.5	- -	- -	- -	- -	4.5
New York	- -	- -	- -	204.0	109.3	- -	- -	- -	94.7	38.5
North Carolina/ South Carolina	- -	- -	- -	346.0	346.0	- -	- -	- -	- -	77.6
Other East SUBTOTAL	- -	- -	- -	1,570.1	1,364.0	- -	- -	- -	206.1	337.9
OTHER U.S. - TOTALS	18.0	- -	18.0	1,902.0	1,601.9	75.2	- -	- -	224.9	410.2
EASTERN U.S. TOTALS	7,520.0	4,626.7	2,893.5	7,294.1	6,402.0	- -	29.7	11.6	850.8	3,076.8
WESTERN U.S. TOTALS	3,470.0	333.2	3,136.9	1,049.2	933.7	88.0	- -	- -	27.5	605.5
U.S. TOTALS	11,008.0	4,959.9	6.048.4	10,245.3	8,942.1	163.2	29.7	11.6	1,103.2	4,092.5

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-15

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Pennsylvania	1,186.0	889.5	296.5	883.9	591.3	- -	19.4	- -	273.1	473.7
Ohio	341.0	245.5	95.5	868.0	654.5	- -	52.9	- -	160.6	264.9
Maryland	87.0	66.1	20.9	109.0	66.5	- -	- -	- -	42.5	43.0
West Virginia	639.3	575.4	63.9	240.0	166.3	- -	- -	- -	73.7	211.7
Northern Appalachian TOTAL	2,253.3	1,776.5	476.8	2,100.9	1,478.6	- -	72.3	- -	549.9	975.3
West Virginia	822.0	674.0	148.0	133.0	133.0	- -	- -	- -	- -	206.4
Virginia	311.4	236.7	74.7	147.0	147.0	- -	- -	- -	- -	97.1
Kentucky	1,111.7	822.7	289.0	108.0	108.0	- -	- -	- -	- -	242.8
Tennessee	9.0	5.0	4.0	436.4	435.1	- -	- -	- -	1.3	97.5
Central Appalachian TOTAL	2,254.1	1,738.4	515.7	824.4	823.1	- -	- -	- -	1.3	643.8
Tennessee	4.5	2.3	2.2	90.8	89.5	- -	- -	- -	1.3	25.3
Georgia	- -	- -	- -	583.3	583.3	- -	- -	- -	- -	129.8
Alabama	138.0	89.7	48.3	490.4	390.8	- -	10.8	- -	88.8	143.6
Southern Appalachian TOTAL	142.5	92.0	50.5	1,164.5	1,063.6	- -	10.8	- -	90.1	298.7
Iowa	- -	- -	- -	27.4	27.0	- -	- -	- -	0.4	6.0
Illinois	2,659.8	2,393.8	266.0	497.1	431.0	- -	24.9	- -	41.3	632.9
Indiana	352.7	268.1	84.6	704.6	512.2	- -	22.5	- -	169.8	218.2
Kentucky	798.9	511.3	287.6	496.1	421.2	- -	- -	59.5	15.4	252.4
Eastern Interior TOTAL	3,811.4	3,173.2	638.2	1,725.2	1,391.4	- -	47.4	59.5	226.9	1,109.5
Missouri	287.1	189.5	97.6	271.5	271.5	- -	- -	- -	- -	106.9
Arkansas	19.0	15.0	4.0	846.2	829.3	- -	16.9	- -	- -	187.3
Oklahoma	15.0	6.8	8.2	48.4	48.4	- -	- -	- -	- -	13.7
Kansas	7.3	- -	7.3	63.6	51.7	- -	12.0	- -	- -	18.0
Nebraska	- -	- -	- -	234.3	234.3	- -	- -	- -	- -	73.8
Iowa	21.5	15.1	6.5	187.7	184.7	- -	- -	- -	3.0	48.8
Western Interior TOTAL	349.9	226.4	123.6	1,651.7	1,619.9	- -	28.9	- -	3.0	448.5
Texas	1,109.6	- -	1,109.6	2,264.5	2,232.8	- -	18.1	- -	3.6	616.2
Louisiana	- -	- -	- -	20.4	20.4	- -	- -	- -	- -	4.5
Arkansas	- -	- -	- -	194.8	194.8	- -	- -	- -	- -	45.1
Texas TOTAL	1,109.6	- -	1,109.6	2,479.7	2,448.0	- -	18.1	- -	13.6	665.8

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, computerized Impact Estimation Program (CIEP).

TABLE F-15

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Continued)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFACTION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Montana	1,470.0	- -	1,470.0	192.6	109.4	- -	83.2	- -	- -	177.1
Wyoming	1,221.0	- -	1,221.0	73.2	14.8	58.3	- -	- -	- -	123.6
Powder River TOTAL	2,691.0	- -	2,691.0	265.8	124.2	58.3	83.2	- -	- -	300.7
Montana	5.0	- -	5.0	17.3	2.0	- -	15.3	- -	- -	6.6
North Dakota	520.0	- -	520.0	274.6	196.3	78.3	- -	- -	- -	102.8
South Dakota	19.0	- -	19.0	160.1	160.1	- -	- -	- -	- -	37.6
Fort Union TOTAL	544.0	- -	544.0	452.0	358.4	78.3	15.3	- -	- -	147.0
Wyoming	424.0	- -	424.0	83.9	27.1	56.8	- -	- -	- -	55.8
Colorado	204.0	81.6	122.4	- -	- -	- -	- -	- -	- -	30.1
Idaho	- -	- -	- -	90.3	90.3	- -	- -	- -	- -	21.3
Utah	- -	- -	- -	8.3	8.3	- -	- -	- -	- -	2.1
Green River-Hams Fork TOTAL	628.0	81.6	546.4	182.5	125.7	56.8	- -	- -	- -	109.3
Colorado	68.0	33.3	34.7	273.1	250.2	- -	- -	- -	22.9	89.4
New Mexico	35.0	35.0	- -	7.9	7.9	- -	- -	- -	- -	11.1
Denver-Raton Mesa TOTAL	103.0	68.3	34.7	281.0	258.1	- -	- -	- -	22.9	100.5
Colorado	77.0	62.4	14.7	- -	- -	- -	- -	- -	- -	20.7
Utah	291.0	256.1	34.9	208.8	184.2	- -	- -	- -	24.9	102.4
Uinta-Southwestern Utah TOTAL	368.0	318.5	49.6	208.8	184.2	- -	- -	- -	24.9	123.1
New Mexico	613.0	6.1	606.9	123.7	68.2	55.5	- -	- -	- -	87.0
Colorado	17.0	10.0	7.0	- -	- -	- -	- -	- -	- -	13.8
Utah	- -	- -	- -	8.3	8.3	- -	- -	- -	- -	1.8
San Juan River TOTAL	630.0	16.1	613.9	132.0	76.3	55.5	- -	- -	- -	102.6

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

TABLE F-15

REGIONAL COAL PRODUCTION AND USE SUMMARIES
STATE DETERMINATION ALTERNATIVE, 1990 MEDIUM PRODUCTION LEVEL(a)
(100,000 tons)
(Concluded)

REGION/STATES	PRODUCTION	DEEP MINED	SURFACE MINED	TOTAL CONSUMPTION	STEAM GENERATION	SYNTHETIC HI-BTU GAS	SYNTHETIC LOW-BTU GAS	LIQUEFAC-TION	METALLURGICAL COKE	TOTAL COAL-RELATED POPULATION
Arizona	140.8	- -	140.8	276.8	204.5	72.5	- -	- -	- -	73.1
California	- -	- -	- -	138.2	110.6	- -	- -	- -	27.6	29.5
Nevada	- -	- -	- -	11.0	11.0	- -	- -	- -	- -	2.9
Oregon/Washington	- -	- -	- -	245.0	245.0	- -	- -	- -	- -	53.8
Other West SUBTOTAL	140.8	- -	140.8	671.0	571.1	72.5	- -	- -	27.6	159.3
Connecticut/Rhode Island/Massachusetts	- -	- -	- -	92.0	92.0	- -	- -	- -	- -	20.4
Delaware/New Jersey	- -	- -	- -	38.0	38.0	- -	- -	- -	- -	9.1
Florida	- -	- -	- -	348.6	348.6	- -	- -	- -	- -	77.2
Maine/New Hampshire/ Vermont	- -	- -	- -	23.0	23.0	- -	- -	- -	- -	5.1
Michigan	- -	- -	- -	518.0	452.7	- -	- -	- -	65.3	109.5
Minnesota/Wisconsin	- -	- -	- -	334.3	313.9	- -	- -	- -	20.4	76.9
Mississippi	- -	- -	- -	24.5	24.5	- -	- -	- -	- -	6.0
New York	- -	- -	- -	457.0	343.2	- -	- -	- -	113.8	92.6
North Carolina/ South Carolina	- -	- -	- -	214.0	214.0	- -	- -	- -	- -	49.6
Other East SUBTOTAL	- -	- -	- -	2,049.4	1,849.9	- -	- -	- -	199.5	446.4
OTHER U.S. - TOTALS	140.8	- -	140.8	2,720.4	2,421.0	72.5	- -	- -	227.1	605.7
EASTERN U.S. TOTALS	9,920.8	7,006.5	2,914.4	9,946.4	8,824.6	- -	177.5	59.5	884.8	4,141.6
WESTERN U.S. TOTALS	4,964.0	484.5	4,479.6	1,522.1	1,126.9	248.9	98.5	- -	47.8	883.2
U.S. TOTALS	15,025.6	7,491.0	7,534.8	14,188.9	12,372.5	321.4	276.0	59.5	1,159.7	5,630.5

(a) Data in 100,000 tons of coal; coal-related population in thousands of people. Data derived from U.S. Department of the Interior, Computerized Impact Estimation Program (CIEP).

APPENDIX G

CHANGE IN COAL-RELATED SOCIO-ECONOMIC CHARACTERISTICS FOR COAL PRODUCING REGIONS

TABLE G-1

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]

1985 LOW LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	123552	27181	1461	124	618	41143	15	11	321	259	247
Central Appalachian	14892	3276	176	15	74	4959	2	1	39	31	30
Southern Appalachian	37653	8284	445	38	188	12539	5	3	98	79	75
Eastern Interior	176220	38768	2084	176	881	58681	21	15	458	370	352
Western Interior	65821	14481	779	66	329	21918	8	6	171	138	132
Texas	121767	26789	1440	122	609	40549	15	10	317	256	244
Powder River	79698	17533	943	80	398	26539	10	7	207	167	159
Green River-Hams Fork	21145	4652	250	21	106	7041	3	2	55	44	42
Fort Union	14662	3226	173	15	73	4883	2	1	38	21	29
San Juan River	5896	1297	70	6	29	1963	1	1	15	12	12
Uinta-Southwestern Utah	21160	4655	250	21	106	7046	3	2	55	44	42
Denver-Raton Mesa	16019	3524	189	16	80	5334	2	1	42	34	32

[a] Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-2

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]

1990 LOW LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	-12628	-2778	-149	-13	-63	-4205	-2	-1	-33	-27	-25
Central Appalachian	18284	4022	216	18	91	6088	2	2	48	38	37
Southern Appalachian	-2167	-477	-26	-2	-11	-722	0	0	-6	-5	-4
Eastern Interior	158809	34938	1878	159	794	52883	19	13	413	333	318
Western Interior	16172	3558	191	16	81	5385	2	1	42	34	32
Texas	57237	12592	697	57	286	19060	7	5	149	120	114
Powder River	31707	6975	375	32	159	10558	4	3	82	67	63
Green River-Hams Fork	25138	5530	297	25	126	8371	3	2	65	53	50
Fort Union	21787	4793	258	22	109	7255	3	2	57	46	44
San Juan River	18615	4095	220	19	93	6199	2	2	48	39	37
Uinta-Southwestern Utah	22277	4901	263	22	111	7418	3	2	58	47	45
Denver-Raton Mesa	23925	5263	283	24	120	7967	3	2	62	50	48

[a] Represents change in coal related socioeconomic characteristic between 1985 and 1990.

TABLE G-3

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	137276	30201	1624	137	686	45713	16	12	257	288	275
Central Appalachian	30498	6710	361	30	162	10156	4	3	79	64	61
Southern Appalachian	87980	19356	1041	88	440	29297	11	7	229	185	176
Eastern Interior	184987	40697	2188	185	925	61601	22	16	481	388	370
Western Interior	99756	21946	1180	100	499	33219	12	8	269	209	200
Texas	182345	40116	2157	182	912	60721	22	15	474	383	365
Powder River	112281	24702	1328	112	561	37390	13	10	292	236	225
Green River-Hams Fork	45364	9980	537	45	227	1406	5	4	118	95	91
Fort Union	22435	4936	265	22	112	7471	3	2	58	47	45
San Juan River	12755	2806	151	13	64	4247	2	1	33	27	26
Uinta-Southwestern Utah	42233	9291	500	42	211	14064	5	4	110	89	84
Denver-Raton Mesa	25617	5636	303	26	128	8531	3	2	67	54	51

[a]Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE C-4

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	108385	23845	1282	108	542	36092	13	9	282	228	217
Central Appalachian	76862	16910	909	77	384	25595	9	7	200	161	154
Southern Appalachian	26739	4883	316	27	134	8904	3	2	70	56	53
Eastern Interior	263608	57994	3118	264	1318	87782	32	22	685	554	527
Western Interior	150384	33084	1779	150	752	50078	18	13	391	316	301
Texas	259427	57074	3068	259	1297	86389	31	22	675	545	519
Powder River	91106	20043	1078	91	456	30338	11	8	237	191	182
Green River-Hams Fork	24016	5283	284	24	120	7997	3	2	62	50	48
Fort Union	60200	13244	712	60	301	20047	7	5	157	126	120
San Juan River	44293	9745	524	44	221	14750	5	4	115	93	89
Uinta-Southwestern Utah	37062	8154	438	37	185	12342	4	3	96	78	74
Denver-Raton Mesa	38709	8516	458	39	194	12890	5	3	101	81	77

[a] Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-5

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]
1985 HIGH LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	149236	32832	1765	149	746	49696	18	13	388	313	298
Central Appalachian	-6808	-1498	-81	-7	-34	-2267	-1	-1	-18	-14	-14
Southern Appalachian	116688	25671	1380	117	583	38857	14	10	303	245	233
Eastern Interior	157314	34609	1861	157	787	52306	19	13	409	330	315
Western Interior	106146	23352	1255	106	531	35347	13	9	276	223	212
Texas	176745	38884	2091	177	884	58856	21	15	460	271	353
Powder River	157360	34619	1861	157	787	52401	19	13	409	330	315
Green River-Hams Fork	58640	12901	694	59	293	19527	7	5	152	123	117
Fort Union	51760	11387	612	52	259	17236	6	4	135	109	104
San Juan River	30268	6659	358	30	151	10079	4	3	79	64	61
Uinta-Southwestern Utah	65979	14515	780	66	330	21971	8	6	172	139	132
Denver-Raton Mesa	36103	7943	427	36	181	12022	4	3	94	76	72

[a] Represents change in coal related socioeconomic characteristics between 1976 and 1985

TABLE G-6

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE NO NEW LEASING ALTERNATIVE[a]

1990 HIGH LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	91667	20167	1084	92	458	30525	11	8	238	193	183
Central Appalachian	96951	21329	1147	97	485	32285	12	8	252	204	194
Southern Appalachian	33002	7260	390	33	165	10990	4	3	86	69	66
Eastern Interior	225073	49516	2662	225	1125	74949	27	19	585	473	450
Western Interior	140286	30863	1659	140	701	46715	17	12	365	295	281
Texas	242301	53306	2866	242	1212	80686	29	21	630	509	485
Powder River	59782	13152	707	60	299	19907	7	5	155	126	120
Green River-Hams Fork	20941	4607	248	21	105	6973	3	2	54	44	42
Fort Union	52117	11466	616	52	261	17355	6	4	136	109	104
San Juan River	38015	8363	450	38	190	12659	5	3	99	80	76
Uinta-Southwestern Utah	38296	8426	453	28	191	12753	5	3	100	80	77
Denver-Raton Mesa	28886	6355	342	29	144	9619	3	2	75	61	58

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-7

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE[a]

1985 LOW LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	123542	27179	1461	124	618	41140	15	11	321	259	247
Central Appalachian	14800	3256	175	15	74	4928	2	1	38	31	30
Southern Appalachia..	37602	8273	445	38	188	12522	5	3	98	79	75
Eastern Interior	176103	38743	2083	176	881	58642	21	15	458	370	352
Western Interior	65576	1 ,27	776	66	328	21837	8	6	170	138	131
Texas	121859	26809	1441	122	609	40579	15	10	317	256	244
Powder River	79667	17527	942	80	398	26529	10	7	207	167	159
Green River-Hams Fork	21124	4647	250	21	106	7034	8	2	55	44	42
Fort Union	17243	3793	204	17	86	5742	2	1	45	36	34
San Juan River	5890	1296	70	6	29	1962	1	1	15	12	12
Uinta-Southwestern Utah	21145	4652	250	21	106	7041	3	2	55	44	42
Denver-Raton Mesa	15973	3514	189	16	80	5319	2	1	42	34	32

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-8

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE[a]

1990 LOW LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	-4258	-937	-50	-4	-21	-1418	-1	0	-11	-9	-9
Central Appalachian	18941	4167	224	19	95	6307	2	2	49	40	38
Southern Appalachian	-1719	-378	-30	-2	-9	-572	0	0	-4	-4	-3
Eastern Interior	158503	34871	1875	159	793	52781	10	13	412	333	317
Western Interior	17350	3817	205	17	87	5778	2	1	45	36	35
Texas	56518	12434	668	57	283	18821	7	5	147	119	113
Powder River	32365	7120	282	32	162	10777	4	3	84	68	65
Green River-Hams Fork	28540	6279	338	29	143	9504	3	2	74	50	57
Fort Union	19146	3992	215	18	91	6043	2	2	47	38	36
San Juan River	19722	4339	233	20	99	6567	2	2	51	41	39
Uinta-Southwestern Utah	24373	5362	288	24	122	8116	3	2	63	51	49
Denver-Raton Mesa	24954	5490	295	25	125	8310	3	2	65	52	50

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-9

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE (a)

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	137042	30149	1621	137	685	45635	16	12	356	288	274
Central Appalachian	28458	6261	337	28	142	9477	3	2	74	60	57
Southern Appalachian	83762	18428	991	84	419	27893	10	7	218	176	168
Eastern Interior	188929	41564	2235	189	945	62913	23	16	491	397	378
Western Interior	93896	20647	111	94	469	31267	11	8	244	197	188
Texas	184304	40547	2180	184	922	61373	22	16	479	387	369
Powder River	112924	24843	1336	113	565	37504	14	10	294	237	226
Green River-Hams Fork	48623	10697	575	49	243	16192	6	4	126	102	97
Fort Union	25179	5539	298	25	126	8384	3	2	65	53	50
San Juan River	12969	2853	153	13	65	4319	2	1	34	27	26
Uinta-Southwestern Utah	43258	9517	512	43	216	14405	5	4	112	91	87
Denver-Raton Mesa	26780	5892	317	27	134	8918	3	2	70	56	54

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-10

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE (a)

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	110426	24294	1306	110	552	36772	13	9	287	232	221
Central Appalachian	71482	15726	845	71	257	23803	9	6	186	150	143
Southern Appalachian	30391	6686	359	30	152	10120	4	3	79	64	61
Eastern Interior	241418	53112	2855	241	1207	80392	29	21	628	507	482
Western Interior	149848	32967	1772	150	749	49899	18	13	390	315	300
Texas	233024	51265	2756	233	1165	77597	28	20	606	489	466
Powder River	162450	35739	1921	162	812	54096	19	14	422	341	326
Green River-Hams Fork	36312	7989	429	36	182	12092	4	3	94	75	73
Fort Union	50597	11131	598	51	263	16849	6	4	132	106	101
San Juan River	37271	8200	441	37	186	12411	4	3	97	78	75
Uinta-Southwestern Utah	28045	6170	332	28	140	9339	3	2	73	59	56
Denver-Raton Mesa	36536	8038	432	37	183	12167	4	3	95	77	73

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-11

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE[a]

1985 HIGH LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	148262	32618	1754	148	741	29371	18	13	385	311	297
Central Appalachian	-11449	-2519	-135	-11	-57	-3813	-1	-1	-30	-24	-23
Southern Appalachian	113730	25021	1345	114	569	37872	14	10	296	239	227
Eastern Interior	143779	31631	1701	144	719	47878	17	12	374	302	288
Western Interior	116448	25619	1377	116	582	28777	14	10	303	245	233
Texas	162761	35807	1925	163	814	54199	20	14	423	342	326
Powder River	172818	38020	2044	173	864	57548	21	15	449	363	346
Green River-Hams Fork	76842	16904	909	77	384	25588	9	7	200	161	154
Fort Union	52448	11539	620	52	262	17465	6	4	136	110	105
San Juan River	30610	6734	362	31	153	10193	4	3	80	64	61
Uinta-Southwestern Utah	67106	14763	794	67	336	22346	8	6	174	141	134
Denver-Raton Mesa	36898	8118	436	37	184	12287	7	3	96	77	74

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-12

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERRED PROGRAM ALTERNATIVE (a)

1990 HIGH LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	372305	81907	4404	372	1862	123977	45	32	968	782	745
Central Appalachian	176041	38729	2082	176	880	58622	21	15	458	370	352
Southern Appalachian	104693	23032	1238	105	523	34863	13	9	272	220	209
Eastern Interior	352236	77492	4166	352	1761	117295	42	30	916	740	704
Western Interior	171049	37631	2023	171	855	56959	21	15	445	350	342
Texas	314813	69259	3724	315	1574	104833	38	27	819	661	630
Powder River	243030	53467	2875	243	1215	80929	29	21	632	510	486
Green River-Hams Fork	43330	9533	512	43	217	14429	5	4	113	91	87
Fort Union	44166	9717	522	44	221	14707	5	4	115	93	88
San Juan River	58237	12812	589	58	291	19393	7	5	151	122	116
Uinta-Southwestern Utah	43722	9619	517	44	219	14560	5	4	114	92	87
Denver-Raton Mesa	59864	13170	708	60	299	19936	7	5	156	126	120

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-13

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERENCE RIGHT PROGRAM ALTERNATIVE[a]

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	127306	28007	1506	127	637	42393	15	11	331	267	255
Central Appalachian	30238	6642	358	30	151	10069	4	3	79	63	60
Southern Appalachian	84395	18567	998	84	422	28103	10	7	219	177	169
Eastern Interior	184283	40542	2180	184	921	61366	22	16	479	387	369
Western Interior	92126	20268	1090	92	461	30678	11	8	240	193	184
Texas	180815	39779	2139	181	904	60211	22	15	470	380	362
Powder River	112363	24720	1329	112	562	37417	13	10	292	236	226
Green River-Hams Fork	46634	10260	552	47	233	15529	6	4	121	98	93
Fort Union	25189	5542	298	25	126	8388	3	2	65	53	50
San Juan River	12699	2794	150	13	63	4229	2	1	33	27	25
Uinta-Southwestern Utah	42728	9400	505	43	214	14228	5	4	111	90	85
Denver-Raton Mesa	26714	5877	316	27	134	8895	3	2	69	56	53

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-14

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE PREFERENCE RIGHT PROGRAM ALTERNATIVE[a]

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	121400	26708	1436	121	607	40426	15	10	316	255	243
Central Appalachian	79075	17397	935	70	395	26332	9	7	206	166	158
Southern Appalachian	33425	7354	395	33	167	11131	4	3	87	70	67
Eastern Interior	236456	52020	2797	236	1182	78740	28	20	615	407	473
Western Interior	147477	32445	1744	147	737	49110	18	13	383	310	295
Texas	252042	55449	2981	252	1260	83930	30	21	655	529	504
Powder River	126679	27869	1498	127	633	42184	15	11	329	266	253
Green River-Hams Fork	22389	4926	275	22	112	7456	3	2	58	47	45
Fort Union	54947	12088	650	55	275	18297	7	5	143	115	110
San Juan River	41601	9152	492	42	208	13853	5	4	108	87	83
Uinta-Southwestern Utah	29121	6407	344	29	146	9697	3	2	76	61	58
Denver-Raton Mesa	36200	7964	428	36	181	12055	4	3	94	76	72

(a) Represents change in coal related socioeconomic characterics between 1985 and 1990.

TABLE G-15

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE EMERGENCY PROGRAM ALTERNATIVE[a]

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	127229	27990	1505	127	636	42367	15	11	331	267	254
Central Appalachian	29192	6422	345	29	146	9721	4	2	76	61	58
Southern Appalachian	86006	18921	1017	86	430	28640	10	7	224	181	172
Eastern Interior	185721	40859	2197	186	929	61845	22	16	483	390	371
Western Interior	93248	20515	1103	93	466	31052	11	8	242	196	186
Texas	181968	40033	2152	182	910	60595	22	15	473	382	364
Powder River	112572	24766	1331	113	563	37487	14	10	293	236	225
Green River-Hams Fork	46084	10138	545	46	230	15346	6	4	120	97	92
Fort Union	25214	5547	298	25	126	8396	3	2	66	53	50
San Juan River	12699	2794	150	13	63	4229	2	1	33	27	25
Uinta-Southwestern Utah	42585	9369	504	43	213	14181	5	4	111	89	85
Denver-Raton Mesa	26739	5883	316	27	134	8904	3	2	70	56	53

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-16

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE EMERGENCY PROGRAM ALTERNATIVE[a]

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	121778	26791	1440	122	609	40552	15	10	317	256	244
Central Appalachian	76551	16841	905	77	383	25491	9	7	199	161	153
Southern Appalachian	29830	6563	353	30	140	9933	4	3	78	63	60
Eastern Interior	255933	56305	3027	256	1280	85226	31	22	665	537	512
Western Interior	151398	33308	1791	151	757	50416	18	13	304	318	303
Texas	351068	55235	2970	251	1255	84606	30	21	653	527	502
Powder River	98110	21560	1159	98	490	32634	12	8	255	206	195
Green River-Hams Fork	24286	5343	287	26	121	8087	3	2	63	51	49
Fort Union	57436	12636	679	56	387	19126	7	5	149	212	115
San Juan River	43590	9590	516	44	218	14515	5	4	113	92	87
Uinta-Southwestern Utah	34425	7573	407	34	172	11464	4	3	90	72	69
Denver-Raton Mesa	36006	7921	426	36	180	11990	4	3	94	76	72

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-17

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR MEET INDUSTRY NEEDS ALTERNATIVE[a]

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	1226679	27869	1498	127	633	42184	15	11	329	266	253
Central Appalachian	12413	2731	147	12	62	4134	1	1	32	26	25
Southern Appalachian	93692	20612	1108	94	468	31199	11	8	244	197	187
Eastern Interior	172910	38049	2045	173	865	57579	21	15	450	363	346
Western Interior	93248	20515	1103	93	466	31052	11	8	242	196	186
Texas	173267	38119	2049	173	866	57698	21	15	450	364	347
Powder River	125409	27590	1483	125	627	41761	15	11	326	263	251
Green River-Hams Fork	67692	14892	801	68	338	22541	8	6	176	142	135
Fort Union	29417	6472	248	29	147	9796	4	3	76	62	59
San Juan River	16116	3546	191	16	81	5367	2	1	42	34	32
Uinta-Southwestern Utah	50352	11077	596	50	252	16767	6	4	131	106	101
Denver-Raton Mesa	28652	6303	339	29	143	9541	3	2	74	60	57

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-18

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE MEET INDUSTRY NEEDS ALTERNATIVE [a]

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	120564	27524	1426	121	503	40148	14	10	313	253	241
Central Appalachian	85440	18797	1011	85	427	28452	10	7	222	179	171
Southern Appalachian	31594	6951	374	32	158	10521	4	3	82	66	63
Eastern Interior	206014	45323	2437	206	1030	68603	25	18	536	433	412
Western Interior	152010	33442	1978	152	750	50619	18	13	395	319	304
Texas	222467	48943	2631	222	1112	74081	27	19	478	467	445
Powder River	184395	40567	2181	184	922	61404	22	16	479	387	369
Green River-Hams Fork	34711	7636	411	35	174	11559	4	3	90	73	69
Fort Union	56395	12407	667	56	382	18780	7	5	147	118	113
San Juan River	41529	9136	491	42	208	13829	5	4	108	87	83
Uinta-Southwestern Utah	34639	7621	410	35	173	11535	4	3	90	72	69
Denver-Raton Mesa	32752	7205	387	33	164	10906	4	3	85	69	66

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-19

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE DOE PRODUCTION PROJECTIONS ALTERNATIVE [a]

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	137047	30150	1621	137	684	45637	16	12	356	288	275
Central Appalachian	27423	6033	324	27	137	9132	3	2	71	58	55
Southern Appalachian	74072	16296	876	74	370	24666	9	6	193	156	148
Eastern Interior	177010	38942	3094	177	885	58944	21	15	460	372	354
Western Interior	100429	22094	1188	100	502	33443	12	9	261	211	201
Texas	178250	39215	2108	178	891	59356	21	15	463	374	356
Powder River	112383	24724	1329	112	562	37424	13	10	292	236	225
Green River-Hams Fork	67167	14777	792	67	336	22367	8	6	175	141	134
Fort Union	18355	4038	217	18	92	6112	2	2	48	39	37
San Juan River	9236	2032	109	9	46	3076	1	1	24	19	18
Uinta-Southwestern Utah	38444	8458	455	38	192	12802	5	3	100	81	77
Denver-Raton Mesa	30620	6736	362	31	153	10197	4	3	80	64	61

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-20

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE DOE PRODUCTION PROJECTIONS ALTERNATIVE[a]

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	115122	25327	1362	115	576	38336	14	10	299	242	230
Central Appalachian	71818	15800	849	72	359	23915	9	6	187	151	144
Southern Appalachian	18049	3971	213	18	90	6019	2	2	47	38	36
Eastern Interior	252582	55568	2988	253	1263	84110	30	21	657	530	505
Western Interior	138873	30552	1643	139	594	46245	17	12	361	292	278
Texas	234630	51619	2775	236	1173	78132	28	20	610	493	469
Powder River	160604	35393	1900	161	803	53481	19	14	418	337	321
Green River-Hams Fork	34073	7496	403	34	170	11346	4	3	89	72	68
Fort Union	39979	8795	473	40	200	13313	5	3	104	84	80
San Juan River	39214	8627	464	39	196	13058	5	3	102	82	78
Uinta-Southwestern Utah	10343	2275	122	10	52	3444	1	1	27	22	21
Denver-Raton Mesa	20349	4477	241	20	102	6776	2	2	53	43	41

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

TABLE G-21

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE STATE DETERMINATION ALTERNATIVE(a)

1985 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	126607	27854	1498	127	633	42160	15	11	329	266	253
Central Appalachian	38092	8380	451	38	190	12685	5	3	99	80	76
Southern Appalachian	77505	17051	917	78	388	25809	9	7	202	163	155
Eastern Interior	192525	42355	2277	193	963	64111	23	16	501	404	385
Western Interior	121166	26656	1433	121	606	40348	15	10	315	254	242
Texas	194228	42730	2297	194	971	64678	23	17	505	408	288
Powder River	100592	22130	1190	101	503	33497	12	9	262	211	201
Green River-Hams Fork	35527	7816	420	36	178	11830	4	3	92	75	71
Fort Union	29401	6468	348	29	147	9791	4	2	76	62	59
San Juan River	17228	3790	204	17	86	5737	2	1	45	36	34
Uinta-Southwestern Utah	42626	9378	504	43	213	14194	5	4	111	90	85
Denver-Raton Mesa	27673	6088	327	28	138	9215	3	2	72	58	55

(a) Represents change in coal related socioeconomic characteristics between 1976 and 1985.

TABLE G-22

COAL PRODUCING REGIONS

SOCIOECONOMIC CHARACTERISTICS FOR THE STATE DETERMINATION ALTERNATIVE(a)

1990 MEDIUM LEVEL

	POPULATION	SCHOOL ENROLLMENT	TEACHERS	PHYSICIANS	HOSPITAL BEDS	HOUSING UNITS	WATER MGD	WASTEWATER MGD	SOLID WASTE TPD	LAW ENFORCEMENT	FIRE PROTECTION
Northern Appalachian	133722	29419	1582	134	669	44529	16	11	348	281	267
Central Appalachian	87388	19225	1034	87	437	29100	10	7	227	184	175
Southern Appalachian	9394	2067	111	9	47	3128	1	1	24	20	19
Eastern Interior	329995	72599	3903	330	1650	109888	40	28	858	693	660
Western Interior	109650	24123	1297	110	548	37513	13	9	285	230	219
Texas	230663	50746	2728	231	1153	76811	28	20	600	484	461
Powder River	79667	17527	942	80	398	26529	10	7	207	167	159
Green River-Hams Fork	8430	1855	100	8	42	2807	1	1	22	18	17
Fort Union	54463	11982	644	54	272	18136	7	5	142	114	109
San Juan River	41891	9216	495	42	309	13950	5	4	109	88	84
Uinta-Southwestern Utah	23888	5255	283	24	119	7955	3	2	62	50	48
Denver-Raton Mesa	21972	7034	378	32	160	10647	4	3	83	67	64

(a) Represents change in coal related socioeconomic characteristics between 1985 and 1990.

APPENDIX H

IMPACT ESTIMATION METHODOLOGY

APPENDIX H

IMPACT ESTIMATION METHODOLOGY

H.1 INTRODUCTION

The Department of Energy's (DOE) National Coal Model (NCM) is designed to forecast coal production, consumption, and prices and to analyze coal-related public policy issues. It generates equilibrium solutions through a linear programming model which balances the supply and demand for coal at minimum cost. The model has a high degree of resolution with 30 supply regions, 35 demand regions, up to 40 possible coal types, and six consuming sectors. The model is capable of making both short-term and long-term annual projections under a variety of policy alternatives because it is demand driven. This means that users of the model have the capability of changing such factors as region specifications, assumed inflation rates, or assumed growth rates in electricity sales through modifications in the data base. Such factors are not a part of the model's structure. This built-in flexibility and high degree of resolution allows users to address public policy issues with a great deal of precision because the model can be tailored for the analysis to be done. In addition, the model offers analysts the capability of performing the sensitivity analyses needed to gauge the uncertainty surrounding a forecast [1].

The NCM has been used as the point of departure for determining the levels of activity in the various phases of the coal cycle.

An allocation algorithm has been employed to adjust the NCM outputs for use in the present analysis. This algorithm: (1) translates the 30 NCM coal production areas and 35 consumption areas to 41 production areas and 53 consumption areas; and (2) estimates interregional flows from the 41 production areas to the 53 consumption areas utilized in this environmental impact statement. This algorithm is further described in Section H.2.

The third analytical tool employed in the impact analysis of this chapter is a computerized program developed for this environmental impact statement, the Coal Impact Estimation Program (CIEP). A detailed description of this program is presented in Section H.3.

H.2 COAL PRODUCTION AND DEMAND PROJECTIONS

H.2.1 DOE Projections (Demand Assumptions)

Three coal production levels were used to specify the DOE National Coal Model demand values—low, mid-range, and high. The level titles relate to expected coal consumption and the demand for western coal. Model runs for each level were made by DOE for 1985 and 1990, giving six possible level/year combinations. The levels relate to values assumed for each of the following parameters:

- Crude oil prices and availability.
- Gas prices and availability.
- Coal labor costs.
- Coal transportation costs.
- Electricity demand growth rates.
- Nuclear capacity.
- Air pollution control regulations and scrubber costs.
- Coal conversion regulations and industrial coal consumption.
- Synthetic fuel production.
- Local coal provisions.
- Federal leasing assumptions.

The level of each parameter is based upon assumptions described below. Tables H-1 and H-2 summarize the assumptions for each of the three levels for 1985 and 1990, respectively.

H.2.1.1 Crude Oil Prices and Availability. The oil prices for the 1985 low level were developed from the Project Independence Evaluation System (PIES) forecasting model. This forecast assumed crude oil at $13 per barrel (1975 dollars). From this price, it was then forecast that prices for 0.9 percent sulfur residual oil in Texas would be $2.30 per million Btu, while distillate would be $2.70 per million Btu.

TABLE H-1

ASSUMPTIONS FOR
DOE'S 1985 REGIONAL COAL PRODUCTION LEVELS

	High	Mid-Range	Low
1. Crude Oil Prices in 1985 ($1975)	$20/bbl	$15/bbl	$13/bbl
2. Gas Prices in 1985 ($1975)	Same as mid-range	Senate conferees proposal	Continuation of existing regulations
3. Coal Labor Costs	Same as mid-range except 2%/yr. real escalation after 1980	UMW settlement with 1%/yr. real escalation in the post-1980 period	Same as mid-range except zero real escalation after 1980
4. Transportation Costs	Same as mid-range	Current ICC rates escalated for inflation	1%/yr. real escalation over current rates
5. Electricity Growth Rate (1977-1985)	NERC forecast (5.8%/yr.)	4.6%/yr.	3.5%/yr.
6. Nuclear Capacity (1985)	101 GW	97 GW	84 GW
7. Environmental Regulations			
• Utilities	Same as mid-range	• 85% FGD in the East • 60% FGD on low sulfur coal	• 90% FGD on all new plants
• Industry	Same as mid-range	FGD on all new boilers greater than 25 MW	FGD on all new boilers greater than 5 MW

TABLE H-1 (concluded)

	High	Mid-Range	Low
8. Coal Conversion Regulations			
• Utilities	Same as mid-range	Regulatory Program passed by conference committee	Existing Regulations
• Industry	Same as mid-range	Boiler only oil/gas user tax and conference regulatory bill	Existing Regulations
9. Macro-economic Forecast (1975-1985)	Same as mid-range	DRI TRENDLONG	Same as mid-range
10. Synthetic Fuel Production (1985)	40 million tons	20 million tons	12 million tons
11. Exports (1985)	Same as mid-range	71 million tons	Same as tons

UMW : United Mine Workers
NERC: National Electric Reliability Council
GW : Giga Watt or 10^9 watts
FGD : Flue Gas Desulfurization
ICC : Interstate Commerce Commission
DRI : Data Resources Incorporated

SOURCE: Reference Number 1.

TABLE H-2

ASSUMPTIONS FOR
DOE's 1990 REGIONAL COAL PRODUCTION LEVELS

	High	Mid-Range	Low
1. Crude Oil Prices in 1990 ($1975)	$30/bbl	$20/bbl	$13/bbl
2. Gas Prices in 1990 ($1975)	Same as mid-range	Senate conferee proposal	Continuation of existing regulations
3. Coal Labor Costs	Same as mid-range except 2%/yr. real escalation after 1980	UMW settlement with 1%/yr. real escalation in the post-1980 period	Same as mid-range except zero real escalation after 1980
4. Transportation Costs	Same as mid-range	Current ICC rates excalated for inflation	1%/yr. real escalation over current rates
5. Electricity Growth (1985-1990)	4.5%/yr	4.0%/yr.	3.5%/yr.
6. Nuclear Capacity	181 GW	167 GW	150 GW
7. Environmental Regulations			
• Utilities	Same as mid-range	• 85% FGD in the East • 60% FGD on low sulfur coal	90% FGD on all new plants
• Industry	Same as mid-range	• FGD on all new boilers	FGD on all new boilers greater than 5 MW

TABLE H-2 (concluded)

	High	Mid-Range	Low
8. Coal Conversion Regulations			
• Utilities	Same as mid-range	Regulatory program passed by conference	Existing regulatory bill
• Industry	Same as mid-range	Boiler only oil/gas user tax & conference regulatory bill	Existing regulatory bill
9. Macro-economic Forecast (1985-1990)	Same as mid-range	DRI TRENDLONG	Same as mid-range
10. Synthetic Fuel Production (1990)	110 million tons	55 million tons	25 million tons
11. Exports (1990)	Same as mid-range	75 million tons	Same as mid-range

UMW : United Mine Workers
NERC: National Electric Reliability Council
GW : Giga Watt or 10^9 watts
FGD : Flue Gas Desulfurization
ICC : Interstate Commerce Commission
DRI : Data Resources Incorporated

SOURCE: Reference Number 1.

H.2.1.2 Gas Prices and Availability. Gas prices for the low levels (1985 and 1990) assumed a continuation of existing regulations. Prices and availabilities for 1985 were based on PIES forecast model output. Prices and availabilities for 1990 were based on the PIES mid-range trendlong level (Series C) with natural gas regulation and $13 per barrel oil (1975 dollars).

H.2.1.3 Coal Labor Costs. The mid-range levels (1985 and 1990) incorporated the terms of a recent United Mine Workers Association (UMWA) settlement. In addition, they assumed a real escalation in labor costs of one percent per year in the post-1980 period. The low level (1985 and 1990) was the same as the mid-range, except there was no labor cost escalation after 1980. The high level alternatives (1985 and 1990) were the same as the mid-range, except that there was a two percent annual real escalation in labor costs after 1980.

H.2.1.4 Coal Transportation Costs. The mid-range and high levels (1985 and 1990) reflect 1977 current Interstate Commerce Commission (ICC) rates, escalated at the assumed general inflation rate of 5.5 percent. The low case reflects 1977 ICC rates with a one percent annual real escalation.

H.2.1.5 Electricity Demand Growth Rates. Electricity growth rates for each level were as follows (percent/year):

	Low	Mid-Range	High
1975-85	4.0	4.8	5.8
1985-90	3.5	4.0	4.5

For the 1985 mid-range levels, the regional distributions were developed from PIES Model Forecast 5, which had a 4.82 percent average national growth rate. The growth rate for each PIES region was assigned to each of the component U.S. Census regions. Where U.S. Census regions overlapped PIES regions, the growth rate for the U.S. Census region was developed as a weighted average.

The 1985 high level was based on the National Electric Reliability Council (NERC) forecast, which assumed an annual growth rate of 5.8 percent. This distribution was also based on NERC data, and in some cases was quite different from the PIES regional growth patterns

The 1985 low alternative was developed from the mid-range level by scaling down the growth rates. This was done in two steps. First, each region's growth rate was scaled down by dividing by the ratio of the national growth rates; e.g., 4.82 percent/4.0 percent = 1.205. These new regional growth rates were then applied to the 1975 regional sales to project 1985 sales by region. The national total and implied growth rates were then computed. Since this national growth rate was slightly different than the 4.0 percent target, a second iteration was required. The new national growth rate was divided by 4.0 percent, and the quotient was divided into the regional growth rates. This process can be iterated until the national growth rate is not significantly different from the target of 4.0 percent.

The 1990 electricity demands were developed in a manner similar to that used in the 1985 low level. For the mid-range alternative, the 1985 mid-range regional totals were extended to 1990 by extrapolating regional growth rate by a factor of 1.205. The national total was computed and implicit growth rate determined. This new national growth rate was used as a base for a second iteration on changing the regional growth rates, and the process was repeated until the national growth rate of 4.0 percent was reached.

For the 1990 low and high levels, the process was the same. For each, the 1985 low and high regional totals were used as a base, and the growth rates scaled by the ratio of the 1985 national rate to the 1990 target national rate. The process was repeated until the national growth rates of 3.5 and 4.5 percent were reached.

H.2.1.6 Nuclear Capacity. Nuclear generating capacity for these levels was as follows (in gigawatts):

	Low	Mid-Range	High
1985	84	97	101
1990	150	167	181

These capacity data were provided by Reference 2.

H.2.1.7 Air Pollution Control Regulations.

Best Available Control Technology (BACT) is defined as 90 percent SO_2 removal, except that partial scrubbing would be permitted if annual average SO_2 emissions were reduced to a specified floor:

Level	Floor (lb. SO_2/MBtu)
Low-Range	0.2
Mid-Range	0.5
High-Range	0.5

The industrial BACT regulations vary by level as follows. All industrial facilities with greater than 25 MWe capacity are subject to the regulations in the high and mid-range alternatives. Industrial facilities with capacity of five MWe or greater are subject to BACT regulations in the low range level. These regulations were addressed in the industrial demand estimates [3].

H.2.1.8 Coal Conversion Regulations and Industrial Coal Consumption. For utilities, the low level assumed a continuation of existing regulations. Combined cycle systems were allowed anywhere. The mid-range and high levels assumed the regulatory program passed by the Conference Committee. Combined cycle systems were prohibited everywhere except in southern California.

Industrial coal demand estimates for 1985 reflected the sum of baseline demand and incremental coal demand stimulated by alternative regulatory and incentive programs. The sources and assumptions for the baseline and coal conversion estimates were summarized for each level below.

Level	Baseline Demand	Coal Conversion
High-Range	Same as mid-range.	Same as mid-range.
Mid-Range	PIES Mid-Range/Trendlong Level (1/14/78).	Boiler only oil/gas user tax and Conference regulatory bill.
Low-Range	PIES Mid-Range/Trendlong Level (1/14/78).	Existing regulations

1985 demand estimates by NCM region were provided for two sulfur classes and two ranks (bituminous and subbituminous)[3].

H.2.1.9 Synthetic Fuel Production. Coal demand for synthetics was based on DOE estimates. These estimates indicate demand (in 10^{12} Btu) by end-product (liquefaction, high-Btu gas, medium-Btu gas), NCM demand region, coal-type (bituminous – 11,000 Btu/lb, subbituminous – 9,000 Btu/lb, lignite – 7,000 Btu/lb), year (1985 and 1990), and level (low, medium high). Two adjustments were made to the original estimates. First, demand was aggregated across end-products, resulting in a single "synthetics" demand category. Second, demand from regions AN, KN, and TX were attributed to the coal-type most prevalent, so that each region is demanding only one coal-type (see Table H-3).

H.2.1.10 Local Coal Provisions. The Clean Air Act Amendments of 1977 included a "local coal" provision (now Section 125 of the Act), which would permit, under certain conditions, an order that locally or regionally available coal be used to comply with SIP requirements. This provision was not considered.

H.2.1.11 Federal Leasing Assumptions. For all three levels in both 1985 and 1990, it was assumed that the Federal government would lease enough coal reserves such that the reserves cheapest to mine (regardless of ownership) would be mined first. This assumption has the effect of minimizing total national costs of coal production, transportation, and consumption.

H.2.2 Department of the Interior Production Projections

The establishment of production levels for this environmental statement was not based on any one computer run, forecasting model, or other single mechanical procedure. There was no one authoritative set of future projections or even method of projection readily available; hence, judgmental decisions were necessary. Accordingly, a number of sources of information were considered in forming these judgments. These sources include:

- Department of Energy projections.
- Preliminary Department of the Interior regional environmental impact statements.
- Coal industry and government forecasts.
- Approved and pending mine plans.
- Current production levels.
- Contractually obligated production.

Based on these factors, the production levels shown in Tables H-4 and H-5 were developed. The broadest basis for the state-by-state production estimates embodied in the preferred program is found in the DOE coal production forecasts. Those

TABLE H-3

PIES AND CORRESPONDING NCM DEMAND REGIONS

PIES DEMAND REGION (CENSUS REGIONS)	CORRESPONDING NCM DEMAND REGIONS
1. New England	MV
	MC
2. Mid-Atlantic	NU
	PJ
	WP
3, South Atlantic	WV
	VM
	CA
	GF
	SF
4. East North Central	ON
	OM
	OS
	IL
	IN
	MI
	WI
5. East South Central	EK
	WK
	ET
	WT
	AM
6. West North Central	DM
	IA
	MO
	KN
7. West South Central	AO
	TX
8. Mountain	MW
	CO
	UN
	AN
9. Pacific	WO
	CN
	CS

SOURCE: Reference Number 1.

TABLE H-4

WESTERN PROJECTED PRODUCTION LEVELS,
PREFERRED PROGRAM AND NO NEW LEASING ALTERNATIVES
(1985 and 1990)
(million tons)

REGION	PREFERRED LEASING PROGRAM			NO NEW LEASING		
1985	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Fort Union	16.9	31.9	51.9	16.9	31.9	51.9
Powder River	150.0	205.0	300.0	150.0	204.8	275.0
Green River - Hams Fork	40.0	80.0	130.0	40.0	76.0	99.6
Uinta - Southwestern Utah	15.0	30.0	45.0	15.0	29.6	44.5
Denver-Raton Mesa	2.0	5.0	10.0	2.0	5.0	10.0
San Juan River	15.0	25.0	40.0	15.0	24.8	39.7
1990	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
Fort Union	21.9	41.9	81.9	21.9	51.0	94.9
Powder River	175.0	400.0	600.0	175.0	305.0	335.0
Green River - Hams Fork	70.0	120.0	175.0	66.5	98.7	119.0
Uinta - Southwestern Utah	20.0	40.0	60.0	19.8	45.0	65.0
Denver-Raton Mesa	5.0	10.0	15.0	5.0	10.7	15.0
San Juan River	25.0	50.0	75.0	75.0	59.4	77.3

Source: Reference Number 33.

TABLE H-5

WESTERN PRODUCTION LEVELS, MID-LEVEL ALTERNATIVES
1985 and 1990
(million tons)

COAL REGION	PRLAs ONLY	EMERGENCY LEASING ONLY	MEET INDUSTRY NEEDS	STATE DETER-MINATION	MEET DOE GOALS
1985	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Fort Union	31.9	31.9	36.9	37.4	21.9
Powder River	205.0	205.0	225.0	183.7	204.6
Green River-Hams Fork	77.9	77.0	112.0	57.5	112.0
Uinta-Southwestern Utah	30.0	29.7	35.0	29.4	26.4
Denver-Raton Mesa	5.0	5.0	6.0	7.5	6.0
San Juan River	24.8	24.8	30.0	32.0	22.1
1990	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Fort Union	47.4	50.6	51.9	54.4	22.5
Powder River	355.0	316.0	450.0	269.1	396.1
Green River-Hams Fork	101.0	104.2	150.0	62.8	149.5
Uinta-Southwestern Utah	42.0	44.8	51.0	36.8	28.3
Denver-Raton Mesa	10.5	10.6	10.0	10.3	7.5
San Juan River	54.9	58.4	60.0	63.0	57.2

Source: Derived from Reference Numbers 34 and 35.

forecasts were then modified to reflect the regional configuration adapted for this ES. Insofar as coal flows and production levels in the DOE-furnished data required modification, these modifications were held to a minimum to avoid distortion of the production and distribution pattern. Where necessary, coal flows were allocated to specific destination regions on the basis of population, generation capacity, and industrial demand. Precision at the level of tenths of a point (equivalent to 100,000 tons) does not have much absolute meaning. Such small changes in production levels are most significant in indicating expected relative changes in production levels among regions and, within a region, the expected direction of change in production from one alternative to another. Table H-6 contains a regional list of all counties considered during the impact analyses of Chapters 5 and 7. It should be noted that the counties listed in Table H-6 vary slightly from the counties delineated in the regions of Figure 1-1. For a county listing of Figure 1-1 counties, refer to Appendix J, Table J-1.

H.2.3 Allocation Algorithm and Contraints

The objective of the algorithm is to generate estimates of production and consumption on a regional basis when only limited information is provided about western coal production levels. The algorithm utilizes an origin/destination (O/D) coal flow matrix upon which are superimposed predetermined western coal production levels. The contents of the O/D matrices are reallocated so that regional energy demands are satisfied and the level of coal consumption for each region is identified. This is done for each Federal coal management program alternative being considered. The algorithm uses a translation of the 30 NCM coal production areas and 35 consumption areas (see Table H-7). The NCM regions are translated to 41 production areas and 53 consumption areas in this ES (see Table H-8).

The 35 NCM demand (consumption) areas consist primarily of multistate areas. For example, the States of Alabama and Mississippi are combined to form the NCM consumption area "AM". It was necessary to disaggregate this demand region to its component states in order to more accurately portray production, transportation, and consumption impacts.

Coal flows into multistate consuming areas were allocated among the individual states on the basis of population, projected level of coal demand by energy conversion facilities, and existing patterns of coal consumption by industry and steam electric generation capacity. Specific data sources used for the disaggregation and allocation of coal flows included References 4,5, and 6.

For example, in the specific case of Alabama and Mississippi, it was determined that, on the basis of the data sources and judgmental factors listed, the flows of coal into the NCM area would be distributed 95 percent to Alabama and five percent to Mississippi.

The major assumptions incorporated in the "Allocate" algorithm governing consumption levels include:

- Fixed Btu demand within consuming areas. The level selected reflects national production at a low, medium, or high level.
- Coal flows (in Btus) remain constant for intrastate shipments.
- Tonnage levels of coal flows from origin to destination vary based upon a representative heat value for coal in the producing state.

For each Federal coal management program alternative analyzed, consumption expressed as a demand for energy (heat value equivalent) was assumed to be fixed and represented a particular mix of energy using facilities within a consuming region (consistent with the NCM assumptions).

The assumption of coal flows remaining constant on an intrastate basis was made to incorporate the fact that local coal supplies represent a least cost source of coal. If, under a given program alternative, coal production levels for a particular state decrease by a given percentage, only the levels of coal leaving the state would be reduced.

Under the various production levels and alternate leasing programs analyzed, specific levels of coal flows vary. Reduced flows from one producing area would be offset by increased flow from other areas. The heat value in millions of Btu per ton (MBtu/ton) of coal varies from mine to mine and from state to state. The actual tonnage flows from substitute producing states would be weighted by their relative average heat value. Accordingly, if the heat value per ton of coal from a substitute state is higher than the original supplying state, the actual tonnage flow from the substitute state would be lower.

TABLE H-6

COUNTIES UTILIZED IN FES

APPALACHIAN COAL REGION

Northern Appalachian Coal Region

Maryland	Ohio	Pennsylvania	West Virginia
Allegany	Athens	Allegheny	Barbour
Garrett	Belmont	Armstrong	Braxton
	Carroll	Beaver	Brooke
	Columbiana	Bedford	Calhoun
	Coshocton	Blair	Doddridge
	Fairfield	Butler	Gilmer
	Gallia	Cambria	Grant
	Guernsey	Cameron	Hancock
	Harrison	Centre	Harrison
	Hocking	Clarion	Jackson
	Holmes	Clearfield	Lewis
	Jackson	Clinton	Marion
	Jefferson	Crawford	Marshall
	Lawrence	Elk	Mineral
	Mahoning	Fayette	Monongalia
	Meigs	Forest	Ohio
	Monroe	Fulton	Pendleton
	Morgan	Greene	Pleasants
	Muskingun	Huntingdon	Preston
	Noble	Indiana	Randolph
	Perry	Jefferson	Ritchie
	Pike	Lawrence	Roane
	Portage	Lycoming	Taylor
	Scioto	McKean	Tucker
	Stark	Mercer	Tyler
	Summit	Potter	Upshur
	Trumbull	Somerset	Webster
	Tuscarawas	Tioga	Wetzel
	Vinton	Venango	Wirt
	Washington	Warren	Wood
	Wayne	Washington	
		Westmoreland	

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

Central Appalachian Coal Region

Kentucky	Tennessee	Virginia	West Virginia
Bell	Anderson	Buchanan	Boone
Boyd	Campbell	Dickenson	Cabell
Breathitt	Claiborne	Lee	Clay
Carter	Cumberland	Russell	Fayette
Clay	Fentress	Scott	Greenbrier
Clinton	Morgan	Tazewell	Kanawha
Elliott	Overton	Wise	Lincoln
Floyd	Pickett		Logan
Greenup	Roane		Mason
Harlan	Scott		McDowell
Jackson			Mercer
Johnson			Mingo
Knott			Nicholas
Knox			Pocahontas
Laurel			Putnam
Lawrence			Raleigh
Lee			Summers
Leslie			Wayne
Letcher			Wyoming
Magoffin			
Martin			
McCreary			
Menifee			
Morgan			
Owsley			
Perry			
Pike			
Powell			
Pulaski			
Rockcastle			
Russell			
Wayne			
Whitley			
Wolfe			

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

Southern Appalachian Coal Region

Alabama	Georgia	Tennessee
Bibb	Catoosa	Bledsoe
Blount	Chattooga	Franklin
Cherokee	Dade	Grundy
Cullman	Walker	Hamilton
De Kalb		Marion
Etowah		Putnam
Fayette		Rhea
Franklin		Sequatchie
Greene		Van Buren
Hale		Warren
Jackson		White
Jefferson		
Lamar		
Lawrence		
Madison		
Marion		
Marshall		
Morgan		
Pickens		
Shelby		
St. Clair		
Tuscaloosa		
Walker		
Winston		

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

EASTERN INTERIOR COAL REGION

Illinois

Adams
Bond
Brown
Bureau
Calhoun
Cass
Champaign
Christian
Clark
Clay
Clinton
Coles
Crawford
Cumberland
De Witt
Douglas
Edgar
Edwards
Effingham
Fayette
Ford
Franklin
Fulton
Gallatin
Greene
Grundy
Hamilton
Hancock
Hardin
Henderson
Henry
Iroquois
Jackson
Jasper
Jefferson
Johnson
Kankakee
Kendall
Knox

Illinois (Cont.)

La Salle
Lawrence
Lee
Livingston
Logan
Macon
Macoupin
Madison
Marion
Marshall
Mason
McDonough
McLean
Menard
Mercer
Monroe
Montgomery
Morgan
Moultrie
Peoria
Perry
Piatt
Pike
Pope
Putnam
Randolph
Richland
Rock Island
Saint Clair
Saline
Sangamon
Schuyler
Scott
Shelby
Stark
Tazewell
Union
Vermilion
Wabash

Illinois (Cont.)

Warren
Washington
Wayne
White
Will
Williamson
Woodford

Indiana

Benton
Clay
Daviess
Dubois
Fountain
Gibson
Greene
Knox
Martin
Montgomery
Owen
Parke
Perry
Pike
Posey
Putnam
Spencer
Sullivan
Vanderburgh
Vermillion
Vigo
Warren
Warrick

Kentucky

Butler
Caldwell
Christian
Crittenden
Daviess
Edmonson
Grayson
Hancock
Henderson
Hopkins
Logan
McLean
Muhlenberg
Ohio
Todd
Union
Warren
Webster

Iowa

Muscatine
Scott

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

WESTERN INTERIOR COAL REGION

Arkansas	Iowa	Iowa (Cont.)	Kansas
Crawford	Adair	Lucas	Allen
Franklin	Adams	Madison	Anderson
Johnson	Appanoose	Mahaska	Atchison
Logan	Audubon	Marion	Bourbon
Pope	Boone	Marshall	Brown
Scott	Calhoun	Mills	Chase
Sebastian	Carroll	Monroe	Chautauqua
Yell	Cass	Montgomery	Cherokee
	Clarke	Page	Coffey
	Crawford	Pocahontas	Crawford
	Dallas	Polk	Doniphan
	Davis	Pottawattamie	Douglas
	Decatur	Poweshiek	Elk
	Franklin	Ringgold	Franklin
	Fremont	Sac	Greenwood
	Greene	Shelby	Jackson
	Grundy	Story	Jefferson
	Guthrie	Tama	Johnson
	Hamilton	Taylor	Labette
	Hardin	Union	Leavenworth
	Harrison	Van Buren	Linn
	Henry	Wapello	Lyon
	Humboldt	Warren	Marshall
	Jasper	Wayne	Miami
	Jefferson	Webster	Montgomery
	Keokuk	Wright	Morris
	Lee		Nemaha
			Neosho
			Osage
			Pottawatomie
			Riley
			Shawnee
			Wabaunsee
			Wilson
			Woodson
			Wyandotte

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

WESTERN INTERIOR REGION (Continued)

Missouri	Missouri (Cont.)	Nebraska	Oklahoma
Adair	Jasper	Cass	Atoka
Andrew	Johnson	Douglas	Coal
Atchison	Knox	Johnson	Craig
Audrain	Lafayette	Nemaha	Creek
Barton	Lincoln	Otoe	Haskell
Bates	Linn	Pawnee	Hughes
Benton	Livingston	Richardson	Latimer
Boone	Macon	Sarpy	Le Flore
Buchanan	Marion	Washington	Mayes
Caldwell	Mercer		Mc Intosh
Callaway	Monroe		Muskogee
Carroll	Montgomery		Nowata
Cass	Nodaway		Okfuskee
Cedar	Pettis		Okmulgee
Chariton	Pike		Osage
Clark	Platte		Ottawa
Clay	Putnam		Pawnee
Clinton	Ralls		Pittsburg
Dade	Randolph		Pontotoc
Daviess	Ray		Rogers
De Kalb	Saline		Seminole
Gentry	Schuyler		Sequoyah
Grundy	Scotland		Tulsa
Harrison	Shelby		Wagoner
Henry	St. Clair		Washington
Holt	Sullivan		
Howard	Vernon		
Jackson	Worth		

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

TEXAS COAL REGION

Texas	Texas (Cont.)	Arkansas	Louisiana
Anderson	Limestone	Miller	Caddo
Angelina	Madison		De Soto
Atascosa	Marion		Natchitoches
Bastrop	Medina		Sabine
Bexar	Milam		
Bowie	Morris		
Brazos	Nacogdoches		
Burleson	Navarro		
Caldwell	Panola		
Camp	Rains		
Cass	Robertson		
Cherokee	Rusk		
Dimmit	San Augustine		
Fayette	Shelby		
Franklin	Smith		
Freestone	Titus		
Frio	Trinity		
Gregg	Upshur		
Grimes	Van Zandt		
Guadalupe	Walker		
Harrison	Washington		
Henderson	Williamson		
Hopkins	Wilson		
Houston	Wood		
Lee	Zavala		
Leon			

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

GREEN RIVER-HAMS FORK COAL REGION

Colorado	Wyoming	Utah	Idaho
Garfield	Albany	Morgan	Bingham
Grand	Carbon	Rich	Bonneville
Jackson	Fremont	Summit	Caribou
Moffat	Hot Springs		Madison
Routt	Lincoln		Teton
	Park		
	Sublette		
	Sweetwater		
	Teton		
	Uinta		
	Washakie		
	Big Horn		

POWDER RIVER COAL REGION

Montana	Wyoming
Big Horn	Campbell
Garfield	Converse
Golden Valley	Crook
Mussellshell	Johnson
Powder River	Natrona
Rosebud	Niobrara
Treasure	Sheridan
Yellowstone	Weston

TABLE H-6
(Continued)

COUNTIES UTILIZED IN FES

FORT UNION COAL REGION

Montana	North Dakota	North Dakota (Cont.)	South Dakota
Carter	Adams	McKenzie	Butte
Custer	Billings	McLean	Corson
Daniels	Bowman	Mercer	Dewey
Dawson	Burke	Morton	Harding
Fallon	Burleigh	Mountrail	Meade
McCone	Divide	Oliver	Perkins
Prairie	Dunn	Renville	Ziebach
Richland	Emmons	Sheridan	
Roosevelt	Golden Valley	Sioux	
Sheridan	Grant	Slope	
Wibaux	Hettinger	Stark	
Valley	Kidder	Ward	
	McHenry	Williams	

SAN JUAN RIVER COAL REGION

Colorado	New Mexico	Utah
Archuleta	Bernalilio	San Juan
Dolores	Catron	
La Plata	Lincoln	
Montezuma	Los Alamos	
Montrose	McKinley	
San Juan	Rio Arriba	
San Miguel	Sandoval	
	San Juan	
	Sante Fe	
	Socorro	
	Valencia	

TABLE H-6
(Concluded)

COUNTIES UTILIZED IN FES

UINTA-SOUTHWESTERN UTAH COAL REGION

Colorado	Utah
Delta	Carbon
Garfield	Duchesne
Gunnison	Emery
Mesa	Garfield
Pitkin	Grand
Rio Blanco	Iron
	Kane
	Sanpete
	Sevier
	Uintah
	Utah
	Wasatch
	Washington
	Wayne

DENVER-RATON MESA COAL REGION

Colorado	New Mexico
Adams	Colfax
Arapahoe	
Boulder	
Denver	
Douglas	
Elbert	
El Paso	
Fremont	
Huerfano	
Jefferson	
Las Animas	
Morgan	
Park	
Weld	

TABLE H-7

NATIONAL COAL MODEL SUPPLY AND DEMAND REGIONS (a)

30 NCM SUPPLY REGIONS	35 NCM DEMAND REGIONS
Pennsylvania (PA)	Maine/Vermont/New Hampshire (MV)
Ohio (OH)	Massachusetts/Connecticut/Rhode Island (MC)
Maryland (MD)	New York, upstate (NU)
West Virginia, north (NV)	Pennsylvania, east/New Jersey/New York, downstate (PJ)
West Virginia, south (SV)	Pennsylvania, west (WP)
Virginia (VA)	Virginia/Maryland/Delaware/D.C. (VM)
Kentucky, east (EK)	West Virginia (WV)
Tennessee (TN)	North Carolina/South Carolina (CA)
Alabama (AL)	Georgia/Florida, north (GF)
Illinois (IL)	Florida, south (SE)
Indiana (IN)	Ohio, north (ON)
Kentucky, west (WK)	Ohio, central (OM)
Iowa(IA)	Ohio, south (OS)
Missouri (MO)	Illinois (IL)
Kansas (KS)	Indiana (IN)
Arkansas (AR)	Michigan (MI)
Oklahoma (OK)	Wisconsin (WI)
Texas (TX)	Kentucky, east (EK)
North Dakota (ND)	Kentucky, west (WK)
South Dakota (SD)	Tennessee, east (ET)
Montana, east (EM)	Tennessee, west (WT)
Montana, west (WM)	Alabama/Mississippi (AM)
Wyoming (WY)	North Dakota/South Dakota/Minnesota (DM)
Colorado, north (CN)	Iowa (IA)
Colorado, south (CS)	Missouri (MO)
Utah (UT)	Kansas/Nebraska (KN)
Arizona (AZ)	Arkansas/Oklahoma/Louisiana (AO)
New Mexico (NM)	Texas (TX)
Washington (WA)	Montana/Wyoming/Idaho (MW)
Alaska (AK)	Colorado (CO)
	Utah/Nevada (UN)
	Arizona/New Mexico (AN)
	Washington/Oregon (WO)
	California, north (CN)
	California, south (CS)

(a) SOURCE: Reference Number 36.

TABLE H-8

DEPARTMENT OF THE INTERIOR SUPPLY AND
DEMAND REGIONS

41 Department of Interior Supply Regions		53 Department of Interior Demand Regions	
Alabama	Oregon-Washington	Alabama	Missouri
Arkansas-Western Interior	Pennsylvania	Arizona	Montana-Powder River
Arkansas-Texas Gulf	South Dakota	Arkansas-Western Interior	Montana-Fort Union
Colorado-Green River-Hams Fork	Tennessee-Central Appalachian	Arkansas-Texas	Nebraska
Colorado-San Juan River	Tennessee-Southern Appalachian	California	Nevada
Colorado-Uinta-Southwestern Utah	Texas	Colorado-Green River-Hams Fork	New Mexico-San Juan River
Colorado-Denver-Raton Mesa	Utah-Green River-Hams Fork	Colorado-San Juan River	New Mexico-Denver-Raton Mesa
Georgia	Utah-San Juan River	Colorado-Uinta-Southwestern Utah	New York
Idaho	Utah-Uinta-Southwestern Utah	Colorado-Denver-Raton Mesa	North Carolina-South Carolina
Illinois	Virginia	Connecticut-Massachusetts-Rhode Island	North Dakota
Indiana	West Virginia-Northern Appalachian	Delaware-New Jersey	Ohio
Iowa-Eastern Interior	West Virginia-Central Appalachian	Florida	Oklahoma
Iowa-Western Interior	Wyoming-Powder River	Georgia	Oregon-Washington
Kansas	Wyoming-Green River-Hams Fork	Idaho	Pennsylvania
Kentucky-Central Appalachian		Illinois	South Dakota
Kentucky-Eastern Interior		Indiana	Tennessee-Central Appalachian
Louisiana		Iowa-Eastern Interior	Tennessee-Southern Appalachian
Maryland		Iowa-Western Interior	Texas
Missouri		Kansas	Utah-Green River-Hams Fork
Montana-Powder River		Kentucky-Central Appalachian	Utah-San Juan River
Montana-Fort Union		Kentucky-Eastern Interior	Utah-Uinta-Southwestern Utah
Nebraska		Louisiana	Virginia
New Mexico San Juan River		Maine-New Hampshire-Vermont	West Virginia-Northern Appalachian
New Mexico Denver-Raton Mesa		Maryland	West Virginia-Central Appalachian
North Dakota		Michigan	Wyoming-Powder River
Ohio		Minnesota-Wisconsin	Wyoming-Green River
Oklahoma		Mississippi	

The allocation algorithm utilizes a multiplier concept to convert projected DOE production levels in western coal supply areas to the projected production level of each program alternative. By prespecifying coal production levels in each western region, and allowing production levels in non-western areas to "float" in response to the level of unsatisfied Btu demands in each consuming state, a new origin/ destination matrix of coal tonnage flows was generated. When western coal production was constrained, demand was shifted to eastern producing areas. Since eastern coal has generally higher Btu content, the actual tonnage flows from the substitute supply states are directly proportional (on a MBtu/ton basis) with the preconstrained flows from the original supply state. The new O/D matrices were also used to estimate coal consumption in each coal demand area for each alternative. Domestic coal consumption was estimated by subtracting DOE projected coal exports from designated exporting states. In developing the "Allocate" algorithm, the following assumptions were used:

1.) The weighted MBtu/ton values were determined by using the heat value of each NCM coal category (see Table H-9).

2.) The following heat-value categories are defined in the NCM.

Coal Category	MBtu/Ton	Assumed MBtu/Ton
Z	26	26
H	23-25.99	24.5
M	20-22.99	21.5
S	15-19.99	17.5
L	15	15

3.) Total tonnage shipped (by category) for each producing state was determined and expressed as a percent of total coal produced in that state.

4.) The category percentages were then multiplied by the MBtu/ton value for each coal category. The multiplication products were then summed to obtain a weighted MBtu/ton value for all coal shipments from a given state, as in Table H-10

5). Western coal region production levels were determined exogenous to "Allocate". These levels were fixed and the output of the remaining coal producing areas allowed to "float" in response to fixed Btu demand levels in each consuming area.

H.2.4 Transportation Assumptions (Modal Split)

The assumption was made that the majority of interstate coal movements would be by rail while a smaller volume of intrastate shipments would be transported in this way. The remainder of the intrastate movements would move by barge, highway, or slurry pipeline, depending on existing and projected transportation facilities of these types. Specific modal split information is presented in Table H-11.

Due to the dynamic nature of coal transportation, incorporation of the transportation sector in the analysis requires a methodological approach recognizing the inherent differences between static processes and dynamic flows. In contrast to the other phases of the coal cycle (i.e., production and consumption), the characterization of coal flows in terms of tonnage does not result in a clear presentation of enviromental impacts. The measure chosen to determine transportation environmental impact factors is gross ton-miles generated as a result of transporting coal. In this context, gross ton-miles consists of the following components:

- Net ton-miles - weight of coal times distance moved.
- Tare ton-miles - weight of transportation equipment utilized times round trip distance from mine to destination and return.

The inclusion of tare weight recognizes the fact that trains, trucks, and barges which haul coal also generate environmental impacts during the return trip to the coal mine or loading facility. Within this context, the following additional assumptions were used:

1.) Modal Split Assumptions - Gross Ton-Mile Estimation (see Figure H-1)

2). Interstate Coal Flows - Total gross ton-miles were calculated on the basis of 100 percent movement by rail. This estimate was then adjusted for 1976 waterway coal transport as a percent of total coal moved. (Waterway transport was deducted from total gross ton-miles), and total slurry pipeline net ton mileage added to gross ton-mile estimates to obtain a revised estimate of gross ton-miles.

3) Intrastate Coal Flows

TABLE H-9

WEIGHTED AVERAGE MBTUs/TON 1985 DOE MID-LEVEL PRODUCTION

GEOGRAPHIC UNITS	AVERAGE MBTU/TON
01 Alabama	25.0
04 Arizona	21.6
05(A) Arkansas (W. Int.)	26
05(B) Arkansas (Tx)	15
06 California	0
08(A) Colorado (G.R.)	22.7
08(B) Colorado (S.J.)	22.7
08(C) Colorado (Uinta)	22.7
08(D) Colorado (D-R)	22.7
09 Connecticut/Maryland/Rhode Island	0
10 Delaware/New Jersey	0
12 Florida	0
13 Georgia	25.0
16 Idaho	0
17 Illinois	22.7
18 Indiana	21.9
19(A) Iowa (E. Int.)	21.5
19(B) Iowa (W. Int.)	21.5
20 Kansas	24.5
21(A) Kentucky (C. App.)	25.5
21(B) Kentucky (E. Int.)	22.8
22 Lousiana	0
23 Maine/New Hampshire/Vermont	0
24 Maryland	25.6
26 Michigan	0
27 Minnesota/Wisconsin	0
28 Mississippi	0

TABLE H-9 (Continued)

GEOGRAPHIC UNITS	AVERAGE MBTU/TON
29 Missouri	21.5
30(A)Montana (P.R.)	17.5
30(B)Montana (F.U.)	15
31 Nebraska	24.5
32 Nevada	0
35(A) New Mexico (S.J.R.)	21.5
35(B) New Mexico (D.R.)	21.5
36 Mew York	0
37 North Carolina/South Carolina	0
38 North Dakota	15
39 Ohio	23.4
40 Oklahoma	21.1
41 Oregon/Washington	0
42 Pennsylvania	25.7
46 South Dakota	15
47(A) Tennessee (C.App.)	24.9
47(B) Tennessee (S. App.)	24.9
48 Texas	15
49(A) Utah (G.R.)	25.1
49(B) Utah (S.J.R.)	25.1
49(C) Utah (Uinta)	25.1
51 Virginia	25.5
54(A) West Virginia (N. App.)	25.5
54(B) West Virginia (C. App.)	25.7
56(A) Wyoming (P.R.)	18.9
56(B) Wyoming (G.R.)	18.9

Source: Reference Number 48.

TABLE H-10

EXAMPLE OF WEIGHTED MBTU/TON CALCULATION

(1) Coal Category	(2) Production x 10^6 Tons	(3) Avg. MBtu/Ton	(4) Production as % Total Production	(5) (4)x(3) Weighted MBtu/Ton
Z	109.8	26	83.3	21.658
H	22.0	24.5	16.7	4.091
	131.8		100.0	25.749 (MBtu/ton average)

Source: Reference Number 35.

TABLE H-11

SUMMARY OF TRANSPORTATION STATISTICS 1985 DOE MID LEVEL

CODE	REGION/STATE	Gross Ton-Miles (In million ton miles)					Net Ton-Miles (In million ton miles)				
		(a) TOTAL	% WATERWAY	% PIPELINE	% RAILROAD	% TRUCK	TOTAL	% WATERWAY	% PIPELINE	% RAILROAD	% TRUCK
01	Alabama	38980	0.05	0	0.94	0.01	22174	0.06	0	0.92	0.02
04	Arizona	16480	0	0.08	0.91	0.01	9882	0	0.14	0.86	0
05A	Arkansas	7205	0	0.28	0.72	0	4930	0	0.41	0.59	0
05B	Arkansas	17802	0	0.07	.93	0	10570	0	0.12	0.88	0
06	California	7864	0	0	1.00	0	4428	0	0	1.00	0
08A	Colorado	5982	0	0	1.00	0	3368	0	0	1.00	0
08B	Colorado	5	0	0	1.00	0	3	0	0	1.00	0
08C	Colorado	893	0	0	1.00	0	503	0	0	1.00	0
08D	Colorado	80073	0	0.02	0.98	0	45734	0	0.03	0.96	0.01
09	CT/MA/RI	1929	0	0	1.00	0	1086	0	0	1.00	0
10	DE/NJ	5159	0	0	1.00	0	2905	0	0	1.00	0
12	Florida	7617	0	0	1.00	0	4289	0	0	1.00	0
13	Georgia	16455	0	0	1.00	0	9265	0	0	1.00	0
16	Idaho	12310	0	0.24	0.76	0	8242	0	0.36	0.64	0
17	Illinois	59698	0.10	0	0.89	0.01	34358	0.12	0	0.87	0.01
18	Indiana	31771	0.11	0	0.87	0.02	18332	0.13	0	0.86	0.01
19A	Iowa	195	0	0	1.00	0	110	0	0	1.00	0
19B	Iowa	20725	0	0	0.99	0.01	11666	0	0	0.99	0.01
20	Kansas	29787	0	0.37	0.63	0	21644	0	0.52	0.48	0
21A	Kentucky	42976	0.54	0	0.45	0.01	27318	0.59	0	0.41	0.01
21B	Kentucky	23748	0.98	0	0	0.02	16458	0.98	0	0	0.02
22	Louisiana	600	0	0	1.00	0	338	0	0	1.00	0
23	ME/VT/NH	462	0	0	1.00	0	260	0	0	1.00	0
24	Maryland	16156	0	0	0.99	0.01	9088	0	0	0.99	0.01
26	Michigan	5435	0	0	1.00	0	3060	0	0	1.00	0
27	MN/WI	34767	0	0	1.00	0	19576	0	0	1.00	0
28	Mississippi	4277	0	0	1.00	0	2380	0	0	1.00	0
29	Missouri	67079	0	0	1.00	0	37733	0	0	0.99	0.01
30A	Montana	30002	0	0.06	0.93	0.01	17707	0	0.10	0.89	0.01
30B	Montana	21788	0	0	1.00	0	12268	0	0	1.00	0
31	Nebraska	153026	0	0.06	0.94	0	90456	0	0.11	0.89	0
32	Nevada	3751	0	0.27	0.73	0	2547	0	0.39	0.61	0
35A	New Mexico	6239	0	0	0.97	0.03	3497	0	0	0.97	0.03
35B	New Mexico	10127	0	0	1.00	0	5702	0	0	1.00	0
36	New York	3417	0	0	1.00	0	1924	0	0	1.00	0
37	NC/SC	18662	0	0	1.00	0	10508	0	0	1.00	0
38	North Dakota	39249	0	0	0.99	0.01	22063	0	0	0.99	0.01
39	Ohio	35964	0.20	0	0.77	0.03	21143	0.24	0	0.74	0.02
40	Oklahoma	11842	0.01	0.87	0.12	0	11162	0.01	0.92	0.07	0
41	OR/WA	2730	0	1.00	0	0	2730	0	0	1.00	0
42	Pennsylvania	56929	0.46	0	0.50	0.04	35423	0.51	0.46	0.02	0
46	South Dakota	15945	0	0.29	0.71	0	10998	0	0.42	0.58	0
47A	Tennessee	4965	0.17	0	0.83	0	2906	0	0.20	0.80	0
47B	Tennessee	29538	0.03	0	0.97	0	16740	0.03	0	0.97	0
48	Texas	91562	0	0.41	0.57	0.02	68474	0	0.55	0.43	0.02
49A	Utah	1925	0	0	1.00	0	1084	0	0	1.00	0
49B	Utah	76	0	0	1.00	0	43	0	0	1.00	0
49C	Utah	11599	0	0.10	0.87	0.03	7033	0	0.17	0.81	0.02
51	Virginia	39625	0	0	1.00	0	22309	0	0	0.99	0.01
54A	West Virginia	12637	0.43	0	0.56	0.01	7821	0.48	0	0.51	0.02
54B	West Virginia	21276	0.25	0	0.72	0.03	12660	0.30	0	0.68	0.02
56A	Wyoming	42083	0	0.23	0.77	0	27846	0	0.34	0.66	0
56B	Wyoming	30039	0	0.08	0.91	0	17989	0	0.14	0.86	0
	TOTAL		0.09		0.90	0.01	762765	0.09	0.13	0.77	0.01

(a) Gross ton-mileage estimates presented here represent the sum of gross ton-mileage for rail, truck and waterway transport plus net ton-mileage of slurry pipeline transport.

Source: Reference Number 19.

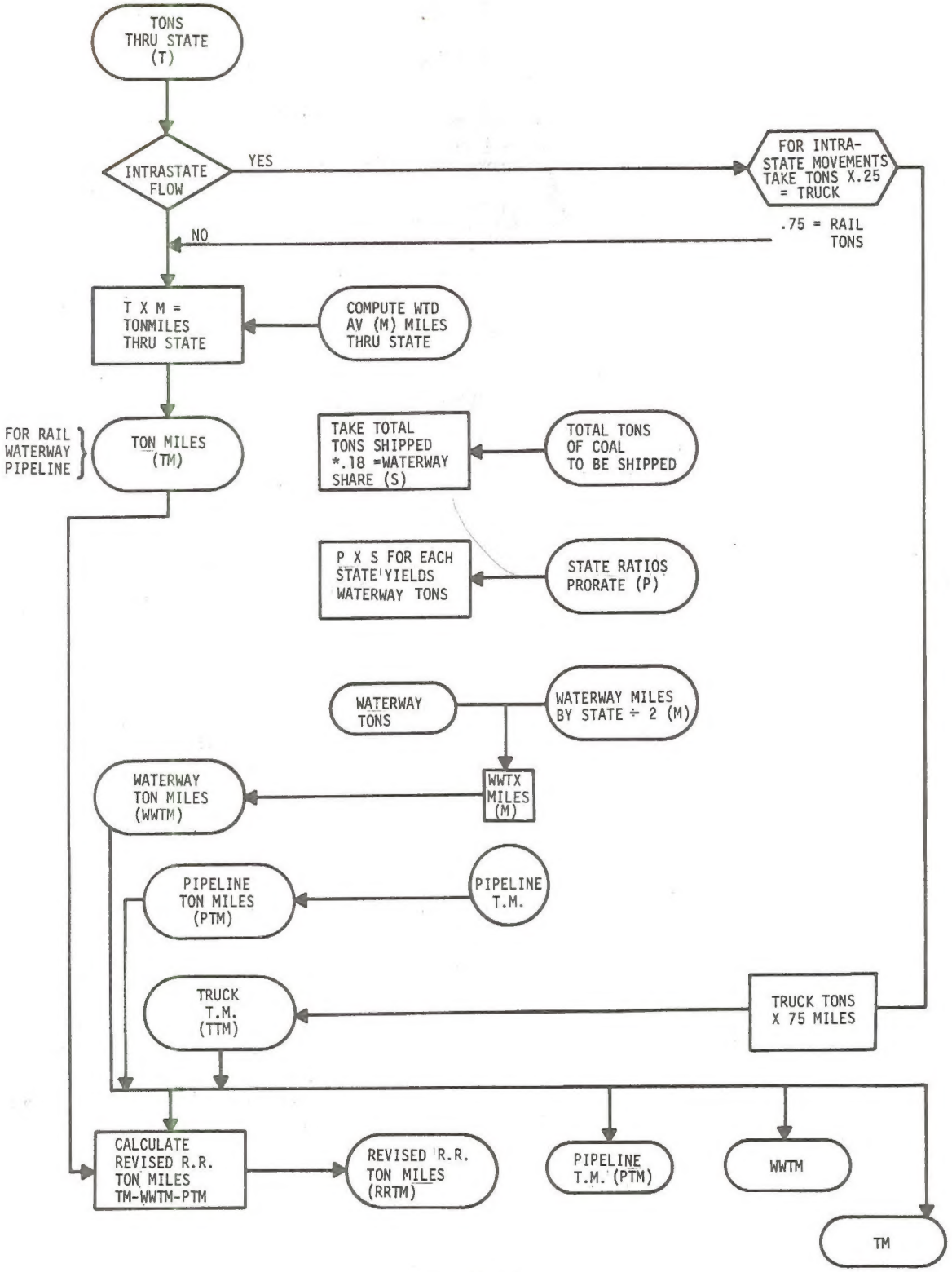


FIGURE H-1

TRANSPORTATION MATRIX-METHODOLOGY (MODAL SPLITS)

- 75 percent moved by rail
- 12 percent moved by truck - average truck haul assumed to be 20 tons moved over 75 mile distance.
- 13 percent minemouth utilization
- Barge transport estimate of gross ton-mileage based on same rationale as interstate flows.
- Slurry pipelines - constant quantity of coal transported for all alternatives analyzed.
- Rail haul distance between origin and destination (intrastate and interstate) assumed to be 1.15 times short line distance to account for rail line circuitry.

H.2.4.1 Ton Mile Analysis - 1985 DOE Mid-level Consumption Estimates. The methodology developed to estimate the base case level of gross ton-mile per state consists of:

1) Identification of a representative origin/destination matrix for the 1985 DOE mid-level coal flows.
2) Identifying all coal flows, probable routes, and length of route within each state between origin and destination.
3) Calculation of number of trips and coal tonnage flows within each state.
4) Combination of coal flow, distance, and transport mode information.
5) Estimation of gross ton-mileage generated per state for the consumption level represented in the origin/destination matrix used.

Estimates of gross ton-mileage per state are presented in Table H-12.

The distribution of gross ton-mileage per state for each program alternative was determined on the following basis:

- The 1985 DOE mid-level coal production consumption used was the base case.
- Production/consumption for each alternative was derived through use of the "Allocate" program. This production/consumption was then divided by the base case to produce a unique ratio for each alternative. Table H-13 presents the calculated ratios for each alternative.
- Base case gross ton-mileage (by mode of transport within each consuming region) was then multiplied by the ratio to obtain revised estimates of gross ton-mileage for each program alternative.

H.3 COAL IMPACT ESTIMATION PROGRAM.

In order to identify and evaluate nationwide coal cycle impacts on a quantitative basis for a range of alternative Federal coal management programs, a computerized analytical tool (the CIEP) has been developed. The CIEP consists of the following major modules:

- Main Impact Estimation Module.
- Socioeconomic Impact Estimation Module
- Ecological Impact Estimation Module

H.3.1 Main Impact Estimation Module.

The five major classes of input information required to operate the Main Impact Estimation Module are:

- Production levels
- Transportation levels
- Consumption levels
- Coal cycle flow distribution
- Environmental loading factors

Coal production, transportation, and consumption estimates for each region of the country are input to the routine to produce numerical estimates of the major environmental impact factors. This is done by expressing coal production, transportation, and consumption levels as flows through the coal cycle. Once quantities of coal flowing into each phase of the coal cycle are calculated (based on percent distribution) for each geographic area, the environmental loading factors are then applied.

H.3.1.1 Production Levels. Production input flows in 100,000 ton units of coal are first divided between surface and underground mining by the application of percent distribution levels. Then the resulting quantities are multiplied by a loading factor to generate impact factors from mining operations. Also, the production input flows are divided between crushing and screening and mechanical cleaning by the application of percent distribution levels. The resulting quantities are then multiplied by a loading factor to generate impact factors from coal cleaning operations. These factors are added to generate total impact factors resulting from production input flows or are stored to be added to factors generated from the other phases of the coal cycle (see Figure H-2).

H.3.1.2 Transportation Levels. Transportation input flows in billion gross ton-miles of coal transported

TABLE H-12

SUMMARY OF TRANSPORTATION STATISTICS
1985 DOE MID-LEVEL SCENARIO
(All Values Except Miles in 000,000s)

Code/Region		Net Ton-Miles				Gross Ton-Miles			Tons				Miles			
		Waterway	Pipeline	Railroad	Motor Carrier	Waterway	Railroad	Motor Carrier	Waterway	Pipeline	Railroad	Motor Carrier	Waterway (Round Trip)	Pipeline (One Way Weighted)	Railroad (Weighted Round Trip)	Motor Carrier (Round Trip Average)
01	AL	1,348		20,593	233	1,932	36,573	475	7.168		95	3.107	375		432	150
04	AZ		1,390	8,462	30		15,029	61		5	22	.400		278	758	150
05A	AR		2,000	2,926	4		5,197	8		25	33	.050		80	179	150
05B	AR		1,250	9,320			16,552			25	59			50	316	
06	CA			4,428			7,864				11				835	
08A	CO			3,366	2		5,978	4			84	.030			81	150
08B	CO			3			5				-(d)				60	
08C	CO			503			893				17				58	
08D	CO		1,500	44,183	51		78,469	104		15	129	.700		100	685	150
09	CT/MA/RI			1,086			1,929				8				278	
10	DE/NJ			2,905			5,159				29				203	
12	FL			4,289			7,617				16				530	
13	GA			9,265			16,455				67				277	
16	ID		3,000	5,242			9,310			10	17			300	627	
17	IL	4,176		29,762	420	5,984	52,857	857	6.425		165	5.600	1,300		361	150
18	IN	2,466		15,641	225	3,534	27,778	459	12.329		113	3.000	400		277	150
19A	IA			110			195				2				100	
19B	IA			11,643	23		20,678	47			62	.306			376	150
20	KS		11,150	10,494			18,637			63	39			177	538	
21A	KY	16,188		11,083	47	23,197	19,683	96	32.540		95	.627	498		234	150
21B	KY(a)	16,188		-(b)	270	23,197	-	551	32.540		-	3.600	498		-	150
22	LA(a)			338			600				1				563	
23	ME/VT/NH			260			462				2				260	
24	MD			9,026	62		16,030	126			64	.827			282	150
26	MI			3,060			5,435				35				174	
27	MN/WI			19,576			34,767				55				717	
28	MS			2,380			4,227				29				163	
29	MO			37,733	32		67,014	65			139	.427			544	150
30A	MT		1,900	15,698	109		27,880	222		.38	98	1.453		50	322	150
30B	MT			12,268			21,788				56				436	
31	NE		9,825	80,631			143,201			63	158			156	1,019	
32	NV		996	1,551			2,755			.12	6			83	495	
35A	NM			3,390	107		6,021	218			32	1.426			214	150
35B	NM			5,702			10,127				15				750	
36	NY			1,924			3,417				25				155	
37	NC/SC			10,508			18,662				44				481	
38	ND			21,815	248		38,743	506			58	3.307			752	150
39	OH	5,022		15,605	516	7,197	27,714	1,053	19.316		109	6.880	520		286	150
40	OK	81	10,250	829	2	116	1,472	4	.462	63	7	.030	350	163	246	150
41	OR/WA		2,730	-(c)			-			10	-			273	-	
42	PA	18,226		16,177	1,020	26,118	28,730	2,081	47.587		77	13.600	765		422	150
46	SD		4,625	6,365	8		11,304	16		25	78	.107		185	163	150
47A	TN	572		2,334		820	4,145		1.034		22		553		215	
47B	TN	572		16,155	13	820	28,691	27	1.034		114	.173	553		283	150
48	TX		37,800	29,592	1,082		52,555	2,207		53	54	14.427		713	1,094	150
49A	UT			1,084			1,925				9				238	
49B	UT			43			76				1				108	
49C	UT		1,200	5,681	152		10,089	310		12	23	2.027		100	485	150
51	VA			22,294	15		39,594	31			103	.200			433	150
54A	WV	3,748		3,953	120	5,371	7,021	245	20.200		42	1.600	186		189	150
54B	WV	3,748		8,619	293	5,371	15,307	598	20.200		67	3.910	186		259	150
56A	WY		9,500	18,346			32,583			73	111			130	330	
56B	WY		2,480	15,453	56		27,445	114		48	64	.747		52	480	150
Total		72,335	101,596	583,694	5,140	103,657	1,036,638	10,487	(e)	(e)	(e)	69	6,184	2,890	19,763	3,900

(a) Since most of Kentucky's coal moves via waterway, using railroad net ton-miles to estimate waterway ton-miles understated ton-miles since waterway traffic is 26 percent more circuitous then rail. Railroad ton-miles have been increased by 26 percent for Kentucky.

(b) Assume zero rail ton-miles.

(c) Assume all pipeline.

(d) Insignificant value equals 0.1.

(e) Since tons are unique to a shipment and not a state, tons for rail and barge cannot be added since this would involve double counting. The same tor moves through all states on its route.

Source: Reference Number 19.

TABLE H-13

RATIOS USED IN TRANSPORTATION[a]

ALTERNATIVES	1976	1985			1990		
		LOW	MED.	HIGH	LOW	MED.	HIGH
Baseline Year	0.592						
DOE Goals			1.0			1.422	
No New Leasing		0.875	0.998	1.073	0.094	1.382	1.66
PRLAs Only			0.995			1.38	
Emergency Leasing			0.997			1.375	
Meet Industry Needs			1.035			1.415	
State Determination			1.005			1.362	
Preferred		0.871	0.996	1.093	0.897	1.397	1.745

(a) Ratios based on estimate done for 1985 DOE Mid-level transportation values by R.L. Banks and Associates, Inc. Ratios derived by adding total production and consumption tonnage per year for each alternative and dividing by the same total for 1985 DOE Mid-level Alternative.

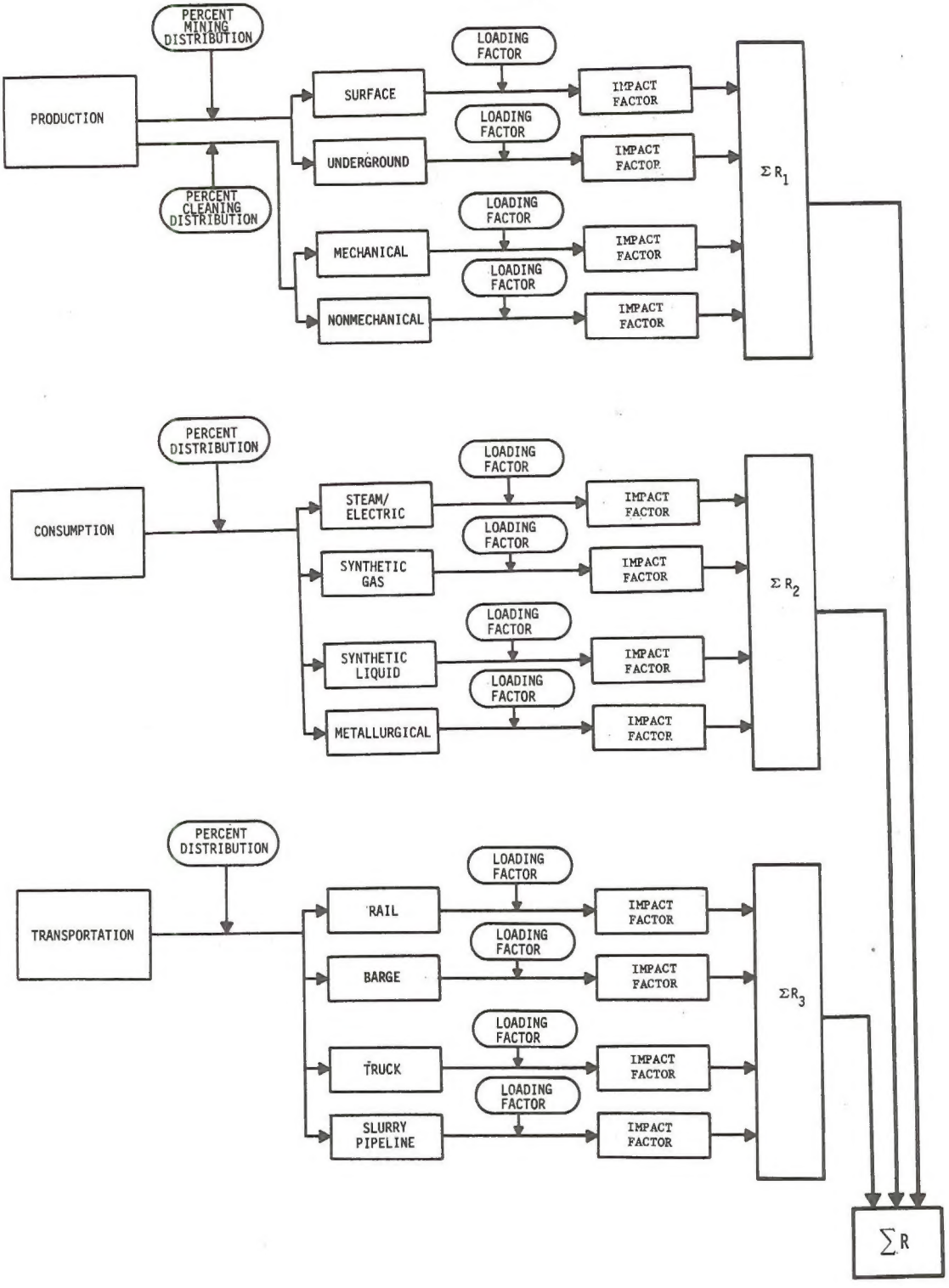


FIGURE H-2

MAIN IMPACT ESTIMATION MODULE (IMPACT FACTOR ESTIMATOR)

are first divided among rail, barge, truck, and slurry pipeline modes by the application of percent distribution levels. Then the resulting quantities are multiplied by a loading factor to generate impact factors from transportation activities. These factors are added to generate total impact factors resulting from transportation input flows or are stored to be added to factors generated from the other phases of the coal cycle.

H.3.1.3 Consumption Levels. Consumption input flows in 100,000 ton units of coal are first divided among steam/electric, synthetic gas, synthetic liquid, and metallurgical use by the application of percent distribution levels. Then the resulting quantities are multiplied by a loading factor to generate impact factors from conversion activities. These impact factors are added to generate total impact factors resulting from conversion input flows or are stored to be added to impact factors generated from the other phases of the coal cycle. Similar impact factors generated from production, transportation, and consumption activities are then added to generate total impact factors resulting from the coal development activity.

H.3.2 Socioeconomic Impact Estimation Module

The Socioeconomic Impact Estimation Module uses estimates of direct construction and direct operating workers generated by the Main Impact Estimation Module and applies employment multipliers to generate estimates of indirect workers. Then the indirect workers are split into married and single components by means of a percent multiplier. The married component is then multiplied by the family size multiplier to generate married workers and dependents. To that, the single component is added to arrive at workers and dependents associated with direct construction workers (see Figure H-3). Similarly the module processes direct operation workers to generate estimates of indirect workers and dependents.

The four separate worker and dependent components are then summed to arrive at a total worker and dependent population. Total population is then multiplied by rates of services and facilities required per 1,000 population to derive estimates of:

- Public school children.
- Physicians.
- Hospitals.
- Housing units.
- Water treatment (mgd).
- Sewerage treatment (mgd).
- Solid waste generated.
- Policemen.
- Firemen.

Teachers are calculated by applying pupil/teacher ratios to public school children. Then, the services and facilities are multiplied by fiscal multipliers to arrive at fiscal requirements on a regional basis.

H.3.3 Ecological Impact Estimation Module

The Ecological Impact Estimation Module uses acreage disturbed throughout the coal cycle, on both a long term and a short term basis, generated in the Main Impact Estimation Module, and applies percent multipliers to estimate acres disturbed by land use category. Acreages disturbed by category (other than cropland) are multiplied by productivity multipliers to generate estimates of natural vegetation (forest, range) lost. Croplands disturbed are multiplied by a percent multiplier to generate estimates of acreage, by crop, such as corn, soybeans, cotton, wheat, oats, and sugarbeets. Each of the agricultural product estimates is multiplied by productivity estimates to generate estimates of the losses in primary productivity such as bushels of corn forgone per acre disturbed (see Figure H-4).

Density multipliers are also used to generate potential decreases in wildlife populations. With the exception of big game (excluding white-tailed deer), other wildlife are assumed to be equally distributed over the entire area disturbed. As such, density multipliers are multiplied by total land disturbed to give potential decreases in small mammal, bird, predator, amphibian/reptile, and deer populations. Estimates of range and pasture disturbed are multiplied by density multipliers to give potential decreases in mule deer and antelope populations, while estimates of forest and wetlands are multiplied by density multipliers to give potential decreases in moose and elk populations.

H.4 ENVIRONMENTAL LOADING FACTORS

The methodology described in Section 5.1 uses "environmental loading factors" to identify and quantify environmental impact factors associated with coal extraction, preparation, transportation,

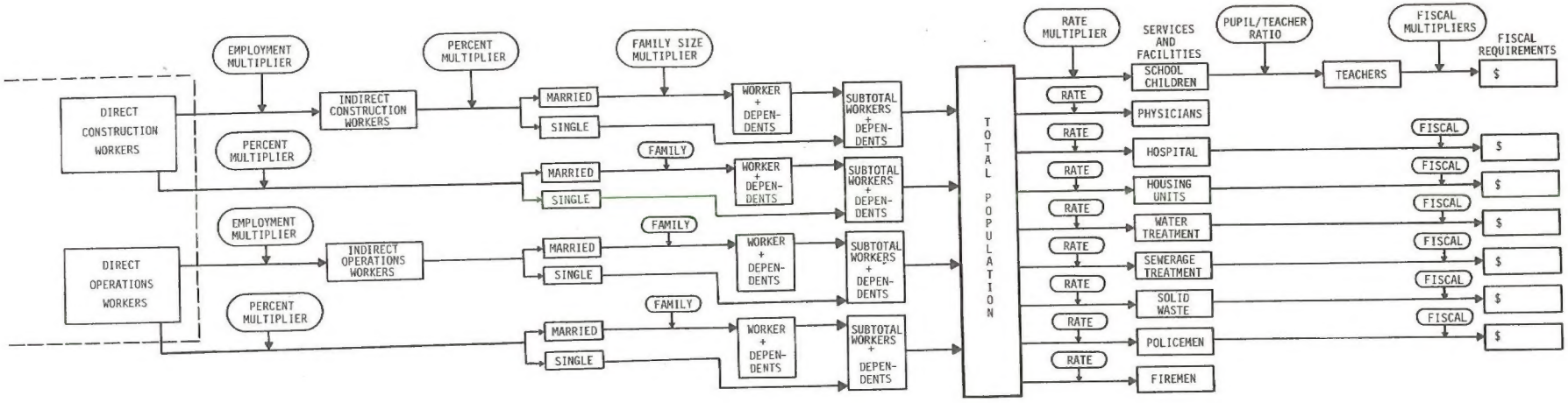


FIGURE H-3

SOCIOECONOMIC ESTIMATION MODULE

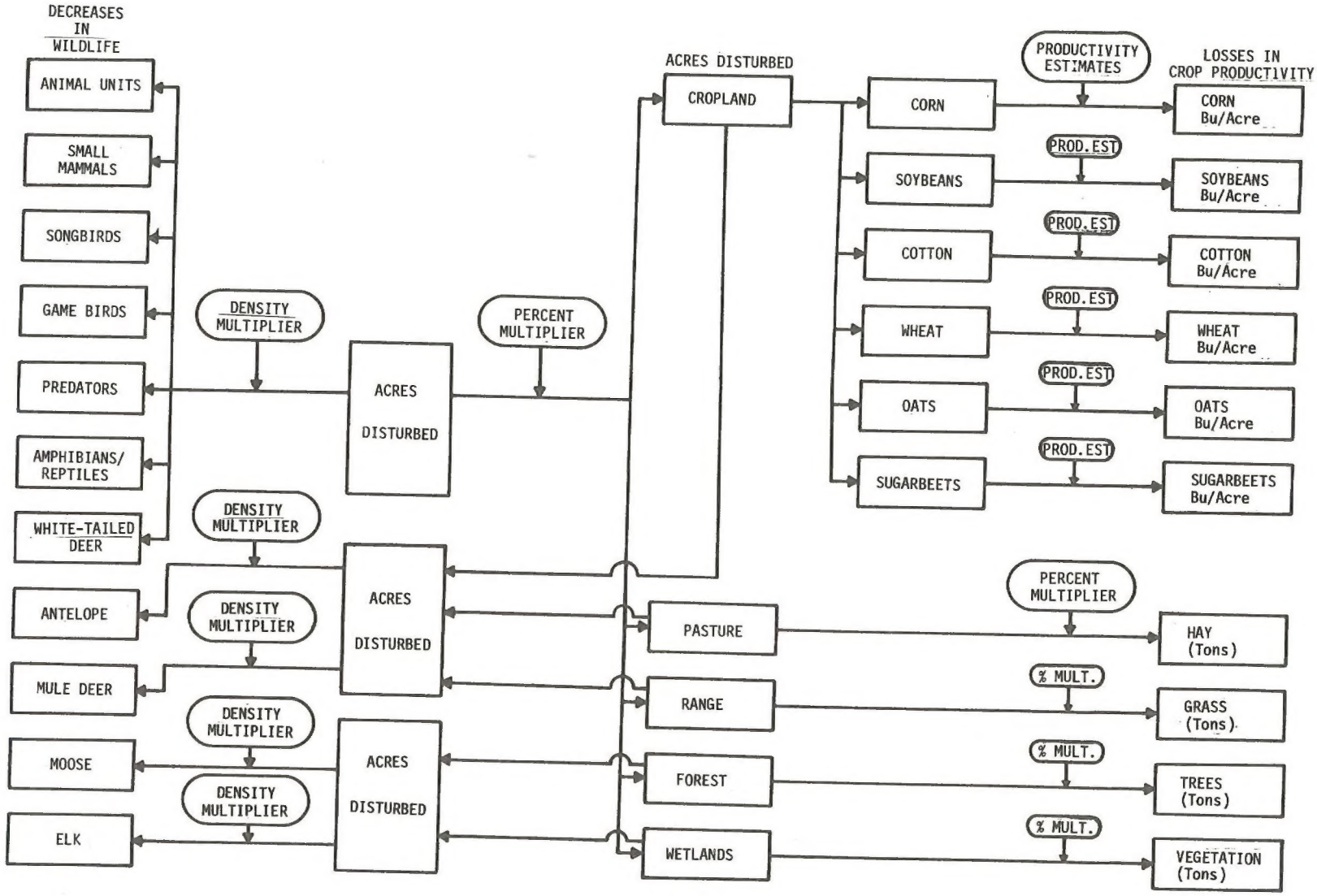


FIGURE H-4

ECOLOGICAL ESTIMATION SUBROUTINE

and conversion. These loading factors relate specific impacts to 100,000-ton units of coal. This approach was used in all coal cycle phases with the exception of transportation. In the transportation sector, impacts were estimated on the frequency of occurrence per billion gross ton-miles travelled. By expressing all impacts in terms of tons of coal, estimation of impact factors can be readily accomplished once a coal production level is determined.

Tables H-14 to H-66 present the environmental loading factors which were applied to flows of coal in the particular geographic units assessed in this ES. In states where no coal production occurred, (e.g., Florida) the production coal flows equaled zero. The transportation and conversion flows were positive, thus resulting in positive impact factors when the appropriate loading factor was applied. The following examples illustrate how the environmental, socioeconomic, and ecologic loading factors were derived.

Environmental loading factors used as input to the Main Impact Estimation Module were generated for 17 major categories for the 53 geographic regions defining the United States (41 producing regions, overlain with 53 consuming regions). Additional multipliers were also generated for a broad range of social, economic, and environmental parameters estimated in the socioeconomic and landloss modules. The environmental loading factors are derived from various literature sources and then multiplied by input data for production, transportation, and conversion to produce impact factors (e.g., impact factors = Flow x Percent x Loading Factor). The following are examples of impact factors developed by the Main Impact Estimation Module.

H.4.1 Total Suspended Particulates (TSP)

The loading factor for particulate (TSP) emissions from crushing and screening operations is 24 pounds of particulate per ton coal cleaned without control devices.[1] By assuming 99 percent control efficiency, the loading factor would be 12 tons/100,000 tons. For example in Colorado, Uinta-Southwestern Utah Coal Region:

	1976[2]	1985[2]	1990[2]
Annual coal production in Colorado (in 100,000 tons)	21.7	43	77
Percent coal cleaned (crushing and screening)	71.9	71.9	71.9
Loading factors tons/100,000 tons	12	12	12
Annual TSP emitted from crushing and screening in tons	188	371	664

H.4.2 Direct Construction Workers

For surface mine construction workers in Colorado, Uinta-Southwestern Utah Coal Region, the impact factors are calculated:

	1976[3]	1985[3]	1990[3]
Annual coal production × 10^5 tons	21.7	43	77
Percent coal mined by surface methods	0	42	19
Loading factors tons/10^5 tons	3.21	3.21	3.21
Numbers of workers required for surface mining	0	58	47

The loading factor is based on peak employment during construction of a 5.6 million ton per year mine and is estimated to be 180 workers.[4] Output of the mine divided into number of workers produces estimates of construction workers per 100,000-ton capacity. This would be 180 divided by ((5.6 times 10^6) divided by 105) which equals 3.21[4].

H.4.3 Direct Operation Workers

The annualized loading factor for underground mine operators in the Colorado portion of the Uinta-Southwestern Utah Coal Region is 19.7.[5] Multiplying this factor by the coal production flow results in the following calculation:

	1985[6]
Annual coal production in Colorado in 100,000 tons	43
Percent mined underground	58
Loading factor in workers/10^5 tons	19.7
Underground miners in Colorado	491

Applying this same methodology to the direct construction worker loading factor of 4.8 yields 120 underground direct construction workers for

[1]Derived from U.S. Environmental Protection Agency, [7].
[2]DOE needs alternative, medium production level.
[3]DOE mid-level.
[4]Toman *et al.*, 1976.[25]
[5]Derived from U.S. ERDA [8]
[6]DOE mid-level.

TABLE H-14

ENVIRONMENTAL LOADINGS FROM

ALABAMA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0*	0.4	0*	0*	132*	3.4*	122.6*	0*	15*	66.3*	10.7*	210*
CO	0*	2.8	0*	0*	182.6*	6.47*	772.1*	0*	50*	13.3*	8.7*	63.5*
SOx	0*	0.3	0*	0*	80*	1.87*	76.0*	0*	104.5	23.4*	68.7*	10.1*
NOx	0*	4.55	0*	0*	520*	19.43*	490.2*	0*	450*	75.0*	50.4*	1.0*
TSP	0*	0.15	12*	18*	35*	0.07 *	35.5*	0*	72	5.3*	1.0*	1.8*
CO_2	9469	9461	1534*	0*	32336*	41114 *	118,732*	0*	284,141	163,168	105,779	25,506*
Water Make-up: Acre/ft	5.887	4.46	1.5**	7.12**	0*	0*	0*	(a)	343*	175*	147*	200.3*
Evaporative	2.94	3.9	0.75**	3.12**	0*	0*	0*	(a)	309*	129*	111*	53.9*
Effluent	2.94	0.56**	0.75**	4.00**	0*	0*	0*	(a)	34*	46*	36*	146.4*
Land Disturbed (Short-term) acres	0*	11.4	0.85**	0.85**	(a)	(a)	(a)	(a)	13.7*	10.89*	6.33*	1.88*
Land Disturbed (Long-term) acres	0*	3.6	0.25**	0.25**	(a)	(a)	(a)	(a)	8.2	6.53	2.9	0.56*
By-Product Solid (tons) Wastes (inactive)	3,000**	0*	15,792	19,775	0*	0*	0*	0*	7,822	10,432	9572	1985*
By-Product Solid Wastes (active)	0*	0*	0*	0*	0*	0*	0*	0*	4,310	414	2,213	0*
Accidents	3.12**	0.053**	0.0051**	0.0153**	1.966*	0*	434.4*	0*	0.0023*	0.0665*	0.044*	0.1*
Fatalities	.04**	0.011**	0.00005**	0.0002**	0.2135*	0*	47.2*	0*	0.00006*	0.0017*	0.0011*	0.001*
Operating Energy (trillion Btu)	0.088**	0.088**	.0154**	0.1**	0.3764*	0.4755*	1.3725*	0.45*	0.066*	0.046*	.019*	0.06*
Direct Construction Workers	4.8**	3.21**	7.8**	15.6**	(a)	(a)	(a)	(a)	38.4*	18.1*	19.73*	14.0*
Direct Operation Workers	37.8	17.8	0.9**	2.67**	22*	44*	1346 .4*	10*	4.38*	12.1*	13.15*	15.6*

* Repeat for 53 geographical units.

** Repeat for producing geographic units only.

(a) Addressed outside the model.

TABLE H-15

ENVIRONMENTAL LOADINGS FROM
ARIZONA-BLACK MESA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.2	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.25	0	0	80	1.87	76.0	0	85.5	23.4	68.7	10.1
NOx	0	3.6	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.45	12	18	35	0.07	35.5	0	120	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32336	41114	118,732	0	236,856	135,974	88,149	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	6.023	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	2.2	.25	.25	(a)	(a)	(a)	(a)	7.9	6.32	2.9	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	28,568	0	0	0	0	0	13,036	17,388	15,954	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3,527	338	1,811	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	22.7	4.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-16

ENVIRONMENTAL LOADINGS FROM
ARKANSAS - WESTERN INTERIOR

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	399	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32336	41114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	.25	.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	13,855	12,650	0	0	0	0	11,298	15,069	13,827	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1,580	8,451	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-17

ENVIRONMENTAL LOADINGS FROM
ARKANSAS - TEXAS

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.2	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	1.45	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.15	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	2.15	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.6	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32336	41114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.7	0.25	0.25	(a)	(a)	(a)	(a)	5.5	4.36	2.53	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	13,855	12,650	0	0	0	0	7,822	10,432	9,572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3,135	301	1,610	0
Accidents	3.21	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	3.6	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-18
ENVIRONMENTAL LOADINGS FROM
CALIFORNIA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	28.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	48	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32336	41114	118,732	0	236,782	135,974	88,368	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	8256	11,102	10,104	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1568	150	805	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-19

ENVIRONMENTAL LOADINGS FROM
COLORADO - GREEN RIVER-HAMS FORK

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	57	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	40	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32336	41114	118,732	0	236,782	135,974	88,149	25,506
Water Make-up: Acre/ft	0	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	4.48	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.3	0.25	0.25	(a)	(a)	(a)	(a)	5.2	4.14	2.41	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	20,737	7,167	0	0	0	0	4345	5796	5318	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	2351	226	1207	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	25.2	4.1	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-20
ENVIRONMENTAL LOADINGS FROM
COLORADO - SAN JUAN RIVER

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.2	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.25	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	3.6	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.45	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32336	41114	118,732	0	236,856	135,974	88,149	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	5.51	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	2.2	.25	.25	(a)	(a)	(a)	(a)	7.9	6.32	2.9	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	20,737	7,167	0	0	0	0	7822	10,432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3135	301	1610	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	22.7	4.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-21

ENVIRONMENTAL LOADINGS FROM

COLORADO - DENVER-RATON MESA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	28.5	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	48	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32336	41114	118,732	0	236,782	135,974	88,368	25,506
Water Make-up: Acre/ft	3.68	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	4.48	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	14.3	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.0	.25	.25	(a)	(a)	(a)	(a)	5.5	4.36	2.53	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	20737	7167	0	0	0	0	8256	11012	10104	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1568	150	805	0
Accidents	3.12	.053	.0051	.0513	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	27.7	5.8	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-22
ENVIRONMENTAL LOADINGS FROM
COLORADO - UINTA-SOUTHWESTERN UTAH

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	95	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9252	9248	1475	0	32336	41114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	5.51	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	5.2	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.1	.25	.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	20,737	7,167	0	0	0	0	6953	9274	8509	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3919	376	2012	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0065	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.93	14.0
Direct Operation Workers	19.7	6.0	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-23

ENVIRONMENTAL LOADINGS FROM
CONNECTICUT - MASSACHUSETTS - RHODE ISLAND

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32336	41114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	8691	11,592	10,636	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6662	640	3420	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-24
ENVIRONMENTAL LOADINGS FROM
DELAWARE - NEW JERSEY

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	8691	11,592	10,636	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6662	640	3,420	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-25

ENVIRONMENTAL LOADINGS FROM FLORIDA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	9,560	12,750	11,700	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-26
ENVIRONMENTAL LOADINGS FROM
GEORGIA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	104.5	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.15	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	9469	9461	1534	0	32,336	41,114	118,732	0	284,141	163,168	105,779	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	11.4	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	.25	.25	(a)	(a)	(a)	(a)	8.2	6.53	3.8	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	23,711	0	0	0	0	0	7822	10432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	4310	414	2213	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.93	14.0
Direct Operation Workers	37.8	17.8	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-27

ENVIRONMENTAL LOADINGS FROM
IDAHO

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	57	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	40	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,782	135,974	88,149	25,506
Water Make-up: Acre/ft	0	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	4.48	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.3	.25	.25	(a)	(a)	(a)	(a)	5.2	4.14	2.47	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	26,770	153	0	0	0	0	4345	5796	5318	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	2351	226	1207	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	25.2	4.1	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-28

ENVIRONMENTAL LOADINGS FROM
ILLINOIS

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.6	.25	.25	(a)	(a)	(a)	(a)	3.2	2.5	1.45	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	5,427	18,902	0	0	0	0	9,560	12,750	11,700	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	19.2	11.2	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-29
ENVIRONMENTAL LOADINGS FROM
INDIANA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.6	.25	.25	(a)	(a)	(a)	(a)	3.2	2.5	1.45	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	4,840	17,306	0	0	0	0	9,560	12,750	11,700	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.4755	1.3725	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	19.2	11.2	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-30
ENVIRONMENTAL LOADINGS FROM
IOWA - EASTERN INTERIOR

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	87.9	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.6	.25	.25	(a)	(a)	(a)	(a)	3.2	2.5	1.45	.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	10,890	8,494	0	0	0	0	9,560	12,750	11,700	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	19.2	11.2	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-31
ENVIRONMENTAL LOADINGS FROM
IOWA - WESTERN INTERIOR

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	399	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	.25	.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	27,590	0	0	0	0	0	11,298	15,069	13,827	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1,580	8,451	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-32
ENVIRONMENTAL LOADINGS FROM
KANSAS

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	399	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	.25	.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	0	28,186	0	0	0	0	11,298	15,069	13,827	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1,580	8,451	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside model.

TABLE H-33
ENVIRONMENTAL LOADINGS FROM
KENTUCKY - CENTRAL APPALACHIAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	209	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.15	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9612	9604	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	129	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	46	146.4
Land Disturbed (Short-term) acres	0	11.4	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	.25	.25	(a)	(a)	(a)	(a)	6.4	5.12	2.97	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	17,399	8,009	0	0	0	0	6953	9274	8509	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	8621	828	4427	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	24.1	12.3	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-34

ENVIRONMENTAL LOADINGS FROM
KENTUCKY - EASTERN INTERIOR

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.6	.25	.25	(a)	(a)	(a)	(a)	3.2	2.5	1.45	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	10,890	8,494	0	0	0	0	9,560	12,750	11,700	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	19.2	11.2	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-35
ENVIRONMENTAL LOADINGS FROM
LOUISIANA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.2	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	1.45	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.15	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	2.15	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.6	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32,336	41,114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.7	.25	.25	(a)	(a)	(a)	(a)	5.5	4.36	2.53	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	28,073	0	0	0	0	0	7822	10,432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3135	301	1610	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	3.6	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-36

ENVIRONMENTAL LOADINGS FROM
MAINE/NEW HAMPSHIRE/VERMONT

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,532	108,491	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	8691	11,592	10,636	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6662	640	3,420	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-37

ENVIRONMENTAL LOADINGS FROM MARYLAND

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	3.9	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.15	12	18	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.3	.25	.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	22,420	1,603	0	0	0	0	8691	11,592	10,636	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6662	640	3,420	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	33.4	10.4	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-38
ENVIRONMENTAL LOADINGS FROM
MICHIGAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	9560	12,750	11,700	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-39

ENVIRONMENTAL LOADINGS FROM
MINNESOTA - WISCONSIN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	266	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	88	5.3	1.0	1.8
CO_2	9395	9388	1516	0	32,336	41,114	118,732	0	280,496	161,076	104,423	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	.147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	9560	12,750	11,700	1987
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	10,972	1,054	5,634	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-40
ENVIRONMENTAL LOADINGS FROM
MISSISSIPPI

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	57	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	40	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,782	135,974	88,149	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	8.2	6.53	3.8	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	4345	5796	5318	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	2351	226	1207	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-41
ENVIRONMENTAL LOADINGS FROM
MISSOURI

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	399	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	205,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	.25	.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	13,390	8,217	0	0	0	0	11,298	15,069	13,827	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1580	8451	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-42

ENVIRONMENTAL LOADINGS FROM
MONTANA - POWDER RIVER

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	47.5	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8316	8313	1218	0	32,336	41,114	118,732	0	225,856	129,698	84,081	25,506
Water Make-up: Acre/ft	0	5.711	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	5.151	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	2.2	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.6	.25	.25	(a)	(a)	(a)	(a)	5.9	4.68	2.72	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	28,564	0	0	0	0	0	7822	10,432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1959	188	1006	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	4.1	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-43

ENVIRONMENTAL LOADINGS FROM
MONTANA - FORT UNION

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	38	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	56	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32,336	41,114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	0	6.299	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	5.739	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	4.8	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.5	.25	.25	(a)	(a)	(a)	(a)	3.6	2.83	1,64	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	28,564	0	0	0	0	0	6084	8114	7445	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1567	150	805	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	3.3	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-44
ENVIRONMENTAL LOADINGS FROM
NEBRASKA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.45	0	0	80	1.87	76.0	0	399	23.4	68.7	10.1
NOx	0	6.25	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	.25	.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	21,572	6,048	0	0	0	0	11,298	15,069	13,827	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1,580	8,451	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-45
ENVIRONMENTAL LOADINGS FROM
NEVADA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	47.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8316	8313	1218	0	32,336	41,114	118,732	0	225,856	129,698	84,081	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	7822	1o,432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1959	188	1006	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.011
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-46
ENVIRONMENTAL LOADINGS FROM
NEW MEXICO/SAN JUAN RIVER

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.2	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.25	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	3.6	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.45	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,856	135,974	88,149	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	5.51	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	2.2	.25	.25	(a)	(a)	(a)	(a)	7.9	6.32	3.67	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	25,270	3,301	0	0	0	0	7822	10,432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3135	301	1610	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	22.7	4.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-47

ENVIRONMENTAL LOADINGS FROM
NEW MEXICO/DENVER-RATON MESA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	28.5	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	48	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,782	135,974	88,368	25,506
Water Make-up: Acre/ft	3.68	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	4.48	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	14.3	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.0	.25	.25	(a)	(a)	(a)	(a)	5.5	4.36	2.53	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	25,270	3,301	0	0	0	0	8256	11,012	10,104	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1568	150	805	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	27.7	5.8	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-48
ENVIRONMENTAL LOADINGS FROM
NEW YORK

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	.147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	8691	11,592	10,636	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6662	640	3,420	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-49
ENVIRONMENTAL LOADINGS FROM
NORTH CAROLINA - SOUTH CAROLINA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	209	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9612	9604	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200.3
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	6953	9274	8509	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	8621	828	4427	0
Accidents	0	0	0	0	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	0	0	0	0	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0	0	0	0	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-50

ENVIRONMENTAL LOADINGS FROM
NORTH DAKOTA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	38	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	56	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32,336	41,114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	0	6.299	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	5.73	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	4.8	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.5	.25	.25	(a)	(a)	(a)	(a)	3.6	2.83	1.64	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	23,219	0	0	0	0	0	6084	8114	7445	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1567	150	805	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	3.3	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-51

ENVIRONMENTAL LOADINGS FROM OHIO

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	3.9	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.15	12	18	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.3	0.25	0.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	20,574	11,280	0	0	0	0	8,691	11,592	10,636	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6,662	640	3,420	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	33.4	10.4	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-52
ENVIRONMENTAL LOADINGS FROM
OKLAHOMA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.7	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	3.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.45	0	0	80	1.87	76.0	0	399	23.4	69.7	10.1
NOx	0	6.25	0	0	520	19.43	490.0	0	450	75.0	50.4	1.0
TSP	0	0.5	12	18	35	0.07	35.5	0	104	5.3	1.0	1.8
CO_2	9252	9245	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	19.0	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.4	0.25	0.25	(a)	(a)	(a)	(a)	5.1	4.05	2.34	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	21,572	6,048	0	0	0	0	11,298	15,069	13,827	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	16,458	1,580	8,451	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	12.3	12.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-53
ENVIRONMENTAL LOADINGS FROM
OREGON - WASHINGTON

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	0	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0	0	0	80	1.87	76.0	0	47.5	23.4	68.7	10.1
NOx	0	0	0	0	520	19.43	490.2	0	450	75.0	50.4	1.0
TSP	0	0	0	0	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8316	8313	1218	0	32,336	41,114	118,732	0	225,856	129,698	84,081	25,506
Water Make-up: Acre/ft	0	0	0	0	0	0	0	(a)	343	175	147	200
Evaporative	0	0	0	0	0	0	0	(a)	309	129	111	53.9
Effluent	0	0	0	0	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0	0	0	(a)	(a)	(a)	(a)	4.1	3.27	1.9	0.56
By-Product Solid (tons) Wastes (inactive)	0	0	0	0	0	0	0	0	7,822	10,432	9,572	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1,959	188	1,006	0
Accidents	0	0	0	0	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0	0	0	0	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0	0	0	0	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	0	0	0	0	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	0	0	0	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-54
ENVIRONMENTAL LOADINGS FROM
PENNSYLVANIA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	3.9	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.15	12	18	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.3	0.25	0.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	10,735	15,442	0	0	0	0	8,691	11,592	10,636	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6,662	640	3,420	0
Accidents	3.12	0.53	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	33.4	10.4	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-55

ENVIRONMENTAL LOADINGS FROM
SOUTH DAKOTA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	38	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.4	12	18	35	0.07	35.5	0	56	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32,336	41,114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	0	6.299	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	5.73	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	4.8	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.5	0.25	0.25	(a)	(a)	(a)	(a)	3.6	2.83	1.64	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	23,219	0	0	0	0	0	6,084	8,114	7,445	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1,567	150	805	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	18.73	14.0
Direct Operation Workers	0	3.3	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-56

ENVIRONMENTAL LOADINGS FROM
TENNESSEE - CENTRAL APPALACHIAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.4	0	0	132	3.49	112.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	209	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.15	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9612	9604	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	0	6.299	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	5.73	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	11.4	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	0.25	0.25	(a)	(a)	(a)	(a)	6.4	5.12	2.97	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	19,163	5,992	0	0	0	0	6,953	9,274	8,509	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	8,621	828	4,427	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.11	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	24.1	12.3	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-57
ENVIRONMENTAL LOADINGS FROM
TENNESSEE - SOUTHERN APPALACHIAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	104.5	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	449.6	75.0	50.4	1.0
TSP	0	0.3	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	9469	9461	1534	0	32,336	41,114	118,732	0	284,141	163,168	105,779	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	11.4	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	0.25	0.25	(a)	(a)	(a)	(a)	8.2	6.53	3.8	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	19,163	5,992	0	0	0	0	7,822	10,432	9,572	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	4,310	414	2,213	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	37.8	17.8	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-58
ENVIRONMENTAL LOADINGS FROM
TEXAS

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.2	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	1.45	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.15	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	2.15	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.6	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8173	8169	1182	0	32,336	41,114	118,732	0	218,570	125,514	81,368	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	2.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.7	0.25	0.25	(a)	(a)	(a)	(a)	5.5	4.36	2.53	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	28,073	0	0	0	0	0	7,822	10,432	9,572	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3,135	301	1,610	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.0	0	0.0023	0.0665	0.044	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	3.6	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-59

ENVIRONMENTAL LOADINGS FROM
UTAH - GREEN RIVER-HAMS FORK

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	57	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.4	12	18	35	0.07	35.5	0	40	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,782	135,974	88,149	25,506
Water Make-up: Acre/ft	0	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	4.48	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.3	.25	.25	(a)	(a)	(a)	(a)	5.2	4.14	2.4	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	14366	14151	0	0	0	0	4345	5796	5318	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	2351	226	1207	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	.088	.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	25.2	4.1	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-60
ENVIRONMENTAL LOADINGS FROM
UTAH-SAN JUAN RIVER

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.2	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.25	0	0	80	1.87	76.0	0	76	23.4	68.7	10.1
NOx	0	3.6	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.45	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,856	135,974	88,149	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	5.51	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	1.84	.56	.56	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	2.2	.25	.25	(a)	(a)	(a)	(a)	7.9	6.32	3.67	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	14366	14151	0	0	0	0	7822	10432	9572	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3135	301	1610	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	.3764	.4755	1.3725	.45	.066	.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	22.7	4.9	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-61
ENVIRONMENTAL LOADINGS FROM
UTAH-UINTA-SOUTHWESTERN UTAH

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	95	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.4	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9252	9248	1475	0	32,336	41,114	118,732	0	273,211	156,893	101,710	25,506
Water Make-up: Acre/ft	3.68	6.079	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	1.84	5.51	.75	3.12	0	0	0	(a)	309	127	111	53.9
Effluent	1.84	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	5.2	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.1	0.25	0.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	14,366	14,151	0	0	0	0	6,953	9,274	8,509	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	3,919	376	2,012	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.0665	0.044	0.1
Fatalities	.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	.3764	0.4755	1.3725	0.45	0.065	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21a	7.8	15,6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	19.7	6.0	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-62
ENVIRONMENTAL LOADINGS FROM
VIRGINIA

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	722.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	209	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.15	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9612	9604	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	11.4	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	.25	.25	(a)	(a)	(a)	(a)	6.4	5.12	2.97	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	15404	10715	0	0	0	0	6953	9274	8509	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	8621	828	4427	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	.088	.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	24.1	12.3	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-63

ENVIRONMENTAL LOADINGS FROM
WEST VIRGINIA-NORTHERN APPALACHIAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	161.5	23.4	68.7	10.1
NOx	0	3.9	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.15	12	18	35	0.07	35.5	0	80	5.3	1.0	1.8
CO_2	9612	9608	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	9.5	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.3	0.25	0.25	(a)	(a)	(a)	(a)	6.3	5.01	2.91	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	10,777	16,749	0	0	0	0	8,691	11,592	10,636	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	6,662	640	3,420	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.0	0	0.0023	0.0665	0.44	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	0.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	33.4	10.4	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-64

ENVIRONMENTAL LOADINGS FROM
WEST VIRGINIA - CENTRAL APPALACHIAN

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	.4	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.8	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	.3	0	0	80	1.87	76.0	0	209	23.4	68.7	10.1
NOx	0	4.55	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	.15	12	18	35	0.07	35.5	0	64	5.3	1.0	1.8
CO_2	9612	9604	1574	0	32,336	41,114	118,732	0	291,427	167,352	108,491	25,506
Water Make-up: Acre/ft	5.887	4.46	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	2.94	3.9	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	2.94	.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	11.4	.85	.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	3.6	.25	.25	(a)	(a)	(a)	(a)	6.4	5.12	2.91	.56
By-Product Solid (tons) Wastes (inactive)	3000	0	10777	16749	0	0	0	0	6953	9274	8509	1985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	8621	828	4427	0
Accidents	3.12	.053	.0051	.0153	1.966	0	434.4	0	.0023	.0665	.044	.1
Fatalities	.04	.011	.00005	.0002	.2135	0	47.2	0	.00006	.0017	.0011	.001
Operating Energy (trillion Btu)	.088	.088	.0154	.1	.3764	.4755	1.3725	.45	.066	.046	.019	.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	24.1	12.3	0.9	2.67	22	44	1346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-65

ENVIRONMENTAL LOADINGS FROM
WYOMING-GREEN RIVER-HAM'S FORK

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	57	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.4	12	18	35	0.07	35.5	0	40	5.3	1.0	1.8
CO_2	8533	8529	1277	0	32,336	41,114	118,732	0	236,782	135,974	88,149	25,506
Water Make-up: Acre/ft	0	5.048	1.5	7.12	0	0	0	(a)	343	175	147	200.3
Evaporative	0	4.48	.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	0.56	.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	7.1	0.35	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	1.3	0.25	0.25	(a)	(a)	(a)	(a)	5.2	4.14	2.4	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	26,770	153	0	0	0	0	4,345	5,796	5,318	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	2,351	226	1,207	0
Accidents	3.12	0.053	0.0051	0.0153	1.966	0	434.4	0	0.0023	0.665	0.44	0.1
Fatalities	0.4	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.11	0.001
Operating Energy (trillion Btu)	0.088	0.088	.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	25.2	4.1	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

TABLE H-66
ENVIRONMENTAL LOADINGS FROM
WYOMING-POWDER RIVER

IMPACT	RECOVERY & EXTRACTION (100,000 tons)		REFINING & PROCESSING (100,000 tons)		TRANSPORTATION (billion ton-miles)				CONVERSION (100,000 tons)			
	Underground Mining	Surface Mining	Crushing & Screening	Mechanical	Rail	Barge	Truck	Slurry Pipeline	Steam (Elect.)	Synthetic Gas	Synthetic Liquid	Metal-lurgical
Air Emissions (Tons):												
HC	0	0.45	0	0	132	3.49	122.6	0	15	66.3	10.7	210
CO	0	2.35	0	0	182.6	6.47	772.1	0	50	13.3	8.7	63.5
SOx	0	0.3	0	0	80	1.87	76.0	0	47.5	23.4	68.7	10.1
NOx	0	3.85	0	0	520	19.43	490.3	0	450	75.0	50.4	1.0
TSP	0	0.4	12	18	35	0.07	35.5	0	72	5.3	1.0	1.8
CO_2	8316	8313	1218	0	32,336	41,114	118,732	0	225,856	129,698	84,081	25,506
Water Make-up: Acre/ft	0	5.711	1.5	7.12	0	0	0	(a)	343	175	142	200.3
Evaporative	0	5.15	0.75	3.12	0	0	0	(a)	309	129	111	53.9
Effluent	0	0.56	0.75	4.00	0	0	0	(a)	34	46	36	146.4
Land Disturbed (Short-term) acres	0	2.2	0.85	0.85	(a)	(a)	(a)	(a)	13.7	10.89	6.33	1.88
Land Disturbed (Long-term) acres	0	0.6	0.25	0.25	(a)	(a)	(a)	(a)	5.9	4.68	2.72	0.56
By-Product Solid (tons) Wastes (inactive)	3,000	0	26,770	153	0	0	0	0	7,822	10,432	9,572	1,985
By-Product Solid Wastes (active)	0	0	0	0	0	0	0	0	1,959	188	1,006	0
Accidents	3.12	0.053	0.0051	0.153	1.966	0	434.4	0	0.0023	0.0665	0.44	0.1
Fatalities	0.04	0.011	0.00005	0.0002	0.2135	0	47.2	0	0.00006	0.0017	0.0011	0.001
Operating Energy (trillion Btu)	0.088	0.088	0.0154	0.1	0.3764	0.4755	1.3725	0.45	0.066	0.046	.019	0.06
Direct Construction Workers	4.8	3.21	7.8	15.6	(a)	(a)	(a)	(a)	38.4	18.1	19.73	14.0
Direct Operation Workers	0	4.0	0.9	2.67	22	44	1,346.4	10	4.38	12.1	13.15	15.6

(a) Addressed outside the model.

this region. These operation and construction worker numbers provide the basis for calculating total population by using the Socioeconomic Impact Estimation Subroutine. Specifically, assuming 1.4 indirect workers per direct worker, a 75 percent married workforce, and a 2.5 person average family size,[7] the following estimates are made.

Underground Workers		Workers and Dependents
Direct operation	491	1,043[8]
Direct construction	120	255
Indirect operation	687	1,467
Indirect construction	168	357
	Total	3,116

This results in a population of 3,116 related to underground mining in Colorado, Uinta-Southwestern Utah Coal Region, for the 1985 DOE mid-level production. When these assumptions and methodologies are applied to all phases of the coal cycle, the total population in the region related to coal production amounts to 7,058.

Remaining socioeconomic characteristics are estimated per 1,000 population units. For example:

Total population	–	7,058
Policemen required per 1,000 population	–	2.1
Total policemen required	–	15

Similar calculations are shown in Table H-67 for other socioeconomic variables. It should be noted that numbers tabulated in other sections of this report may vary slightly from this example since they are related to production level changes between 1976-1985 and 1985-1990.

H.4.4 Acreage Disturbed

Since specific locations for the various activities required for coal development were unknown, a land-use forecast was developed for each region and used as a tool to display potential impacts to the natural environment.

Loading factors (multipliers) for land disturbed to produce 100,000 tons of coal were developed as a function of acreage, coal seam thickness and average yield per acre-foot.

In Colorado, Uinta Southwestern Utah Coal Region, average coal seam thickness is 11 feet, and average yield is 1,750 tons per acre-foot of seam. This yields a multiplier of 5.2 acres for each 100,000 tons of coal required. In 1985, 94 acres would be disturbed per 100,000 tons of coal. This is obtained as follows:

Annual coal production in Colorado in 100,000 tons	43
Percent surface mined	42
Loading factor	5.2
Land disturbed short-term (acres)	94

When these assumptions and methodologies are applied to all phases of the coal cycle the total land disturbed (short-term) would be 156 acres.

These acreage-disturbed impact factors provide the basis for calculating the potential losses of plant and animal productivity by using the Ecological Impact Estimation Module.

Once the total number of acres for each time period was determined, a percentage was allocated to various land uses as presented in Table H-68. The assumption was made that development would occur in currently undeveloped or open areas, and not in urban or built-up areas.

Acres by land-use category were multiplied by productivity estimates (Table H-69) to determine potential losses due to land disturbance. Potential losses to wildlife due to habitat loss were determined by multiplying total acres disturbed for each time period by estimated population densities. (See Tables H-70 and H-71.)

As an illustration, 8,446 acres were estimated to be required for coal development in the Powder River Coal Region under the medium production level of the preferred alternative in 1985. Of this total, 455 acres (five percent) were allocated to cropland, 91 acres (one percent) to pasture, 7,463 acres (88 percent) to range, 73 acres (one percent) to forest, and 364 acres (four percent) to wetland or bottomland forest (see Table H-68). These numbers were analyzed outside the subroutine to allow for the entire time period under consideration.

Following this initial allocation, cropland was further divided into acres by crop, based on major crops grown in the states occurring in the region (see Table H-72) as follows:

Wheat	287 acres (63 percent)
Hay	150 acres (33 percent)
Oats	9.1 acres (2 percent)
Sugarbeets	4.6 acres (1 percent)

[7]Derived from U.S. ERDA [7]

[8]75 percent of 491 is 368 married and 123 single. The married force including their dependents are 368 x 2.5 + 920. Thus, the total of all workers (married and single) including their dependents is 920 + 123 = 1,043.

TABLE H-67

SOCIOECONOMIC CHARACTERISTICS

SOCIOECONOMIC VARIABLES	ESTIMATED NUMBER
Public School Children	1,553
Teachers	83
Physicians	7
Hospital Beds	35
Housing Units	2,350
Water Treatment (mgd)	1
Sewage Treatment (mgd)	1
Solid Waste (tpd)	18
Firemen	14

TABLE H-68

PERCENTAGE OF THE TOTAL LAND DISTURBED ALLOCATED TO VARIOUS LAND-USE CATEGORIES WITHIN EACH REGION

Coal Region	Cropland (%)	Pasture (%)	Range (%)	Forest (%)	Wetland (%)
Northern Appalachian	32	9.5	-	57	1
Central Appalachian	21	18.0	-	60	1
Southern Appalachian	28	14	-	55	2
Eastern Interior	68	11	-	15	5
Western Interior	52	11	15	17	5
Texas	22	8	34	28	8
Powder River	5	1	88	1	4
Green River-Hams Fork	4	1	70	24	1
Fort Union	37	2	54	2	5
San Juan River	2	1	50	45	1
Uinta-Southwestern Utah	3	1	62	33	1
Denver-Raton Mesa	21	1	56	21	-

TABLE H-69

ESTIMATED PRODUCTIVITY PER ACRE FOR NATURAL AND AGRICULTURAL CROP

Coal Region	Upland Forest (tons/acre)	Wetland/ Bottomland Forest (tons/acre)	Range (tons/acre)	Pasture[a] (tons/acre)	Corn[b] (bu/acre)	Soybeans[b] (bu/acre)	Cotton[b] (lbs/acre)	Wheat[b] (bu/acre)	Sugarbeets[b] (tons/acre)	Oats[b] (tons/acre)
Northern Appalachian	8.9	17.8	- -	1.9	79.9	26.8	- -	38.5	- -	48.3
Central Appalachian	8.9	17.8	- -	1.9	79.9	26.8	- -	38.5	- -	48.3
Southern Appalachian	8.9	17.8	- -	1.9	79.9	26.8	380	38.5	- -	48.3
Eastern Interior	8.9	17.8	- -	1.9	100.7	32.5	- -	38.6	- -	- -
Western Interior	8.9	17.8	5.8	2.0	84.6	25.6	390	29.1	- -	- -
Texas	7.1	5.4	5.8	2.3	- -	- -	353	23.3	- -	- -
Powder River	8.0	5.4	6.7	1.7	- -	- -	- -	26.2	19.5	43.0
Green River-Hams Fork	5.4	5.4	2.3	2.2	95.8	- -	- -	23.2	18.4	42.0
Fort Union	6.9	5.4	6.7	1.4	- -	17.3	- -	24.6	19.3	42.1
San Juan River	3.0	5.4	0.5	3.6	96.6	- -	720	35.8	17.8	- -
Uinta-Southwestern Utah	6.9	5.4	1.8	2.5	95.8	- -	- -	23.3	17.8	- -
Denver-Raton Mesa	8.0	- -	7.6	2.9	100.8	- -	380	23.4	18.6	- -

[a] Hay production
[b] Based on the acreage crop yields for the states occurring in each region.

Sources: Reference Numbers 37, 38, 39 and 40.

TABLE H-70

ESTIMATED DENSITIES OF WILDLIFE PER ACRE IN THE VARIOUS REGIONS

Coal Region	Game Birds	Small Mammals	Birds	Amphibians/ Reptiles	Large Predators
Northern Appalachian	0.25	10	3.5	2.5	0.002
Central Appalachian	0.25	10	3.5	2.5	0.002
Southern Appalachian	0.25	10	3.5	2.5	0.002
Eastern Interior	0.20	10	3.5	2.5	0.002
Western Interior	0.20	10	3.5	2.5	0.002
Texas	0.20	10	3.5	3.5	0.002
Powder River	0.03	9	1.0	2.5	0.002
Green River-Hams Fork	0.16	55	2.5	4.5	0.002
Fort Union	0.14	9	1.0	2.5	0.002
San Juan River	0.20	5	2.5	2.6	0.003
Uinta-Southwestern Utah	0.20	5	2.5	2.6	0.002
Denver-Raton Mesa	0.20	9	2.5	2.6	0.002

SOURCES: Reference Numbers 39, 41, 42, 43 and 44.

TABLE H-71

ACRES REQUIRED TO SUPPORT ONE LARGE GAME MAMMAL OR ONE ANIMAL UNIT

Coal Region	White-tailed Deer	Mule Deer	Pronghorn Antelope	Moose	Elk	Animal Units
Northern Appalachian	14	-	-	-	-	2.19
Central Appalachian	14	-	-	-	-	2.19
Southern Appalachian	14	-	-	-	-	2.19
Eastern Interior	166	-	-	-	-	1.7
Western Interior	33	-	-	-	-	2.6
Texas	17	-	-	-	-	6.6
Powder River	33	200	166	-	-	15.5
Green River-Hams Fork	-	125	66	250	125	9.3
Fort Union	33	200	125	-	-	8.2
San Juan River	-	333	-	-	-	22.0
Uinta-Southwestern Utah	-	100	-	-	100	8.3
Denver-Raton Mesa	-	100	100	-	-	16.3

SOURCES: Reference Numbers 39, 41, 42, 43 and 44.

TABLE H-72

PERCENTAGE OF CROPLAND ACRES ALLOCATED TO THE VARIOUS CROPS WITHIN EACH REGION

Coal Region	Corn	Soybeans	Cotton	Wheat	Oats	Sugarbeets	Hay
Northern Appalachian	35	23	-	10	2	-	28
Central Appalachian	24	33	-	3	-	-	40
Southern Appalachian	19	48	6	-	-	-	27
Eastern Interior	50	36	-	9	-	-	4
Western Interior	27	25	2	29	-	-	16
Texas	-	31	29	23	-	-	15
Powder River	-	-	-	63	2	1	33
Green River-Hams Fork	9	-	-	43	1	2	44
Fort Union	-	-	-	60	11	-	27
San Juan River	10	-	5	47	-	2	35
Uinta-Southwestern Utah	11	-	-	49	-	2	36
Denver-Raton Mesa	13	-	1	53	-	2	31

By multiplying acres by average yields per acre for the respective crops, (Table H-69), an estimate of the potential agricultural production loss can be determined.

Crop	Acres	Average Yield	Potential Loss
Wheat	287	26.2 bu/acre	7,520 bushels
Hay	241[10]	1.7 tons/acre	255 tons
Oats	9.1	43.0 bu/acre	391 bushels
Sugarbeets	4.6	19.5 tons/acre	90 tons

Similarily, by multiplying acres allocated to range and forest (upland and bottomland) by rate of potential production (Table H-69), productivity losses for natural ecosystems can be determined. (See Table H-73)

Potential loss of wildlife due to habitat loss was estimated by the module by multiplying typical population densities (Tables H-70 and H-71) by the number of acres disturbed. (See Table H-74.)

The above potential losses in natural and agricultural productivities and wildlife reflect the short-term effects due to total land conversion during 1985. To determine potential losses from 1976-1985, land disturbed by mining was multiplied by ten to give an estimate of total mining land required, and added to estimates of land required for coal cleaning and conversion industry. Actual losses would be determined by site-specific characteristics, and the acres actually subjected to the direct and indirect effects associated by specific activities.

H.5 DERIVATION OF ENVIRONMENTAL LOADING FACTORS

H.5.1 AIR EMISSIONS

H.5.1.1 Recovery and Extraction. The air emissions from mining 100,000 tons of coal were calculated as follows.

Air emissions from surface mining operations are generated from the use of diesel equipment. Emissions from underground mining operations are assumed to be negligible because of the wide use of electrical equipment. Table H-75 shows the air loading factors for the coal regions that were derived from U.S. Energy, Research, and Development Administration. [8]

H.5.1.2 Coal Cleaning (Beneficiation).

Coal cleaning is the process by which undesirable materials are removed from bituminous and anthracite coal and lignite. The coal is screened, classified, washed, and dried at coal preparation plants. The major sources of air pollution from these plants are the thermal dryers. The average particulate emisions are: 24 lb/ton of coal cleaned without control, and by assuming 99 percent control efficiency, particulate emissions would be 12 tons/100,000 tons of coal crushed and screened. For mechanically cleaned coals, the emission factor would be 18 tons/100,000 tons of coal cleaned. [7]

H.5.1.3 Transportation. The loading factors for coal transportation systems are based on gross ton-miles transported (which incorporates the coal weight plus weight of equipment, as well as the weight of equipment that returns empty). The next step in the methodology is to calculate total gross ton-miles on a state-by-state basis. This is accomplished through calculation of route lengths for origin/destination flows of coal. Total ton-miles per state were expressed on the basis of 10^9 gross ton-miles. Multipliers were then calculated in terms of impacts generated per billion (10^9) ton-miles.

Because of their widespread use, transportation facilities are responsible for a large share of air pollutant emissions in many areas of the United States. Typical unit train emissions have been estimated at 18.5, 6.5, and 4.7 pounds of nitrogen oxides, carbon monoxide, and hydrocarbon respectively, per train mile of travel (for long-haul rail) [7].

Similarly, emissions from tugs, trucks, and locomotives (short haul) are based on emission factors derived from U.S. Environmental Protection Agency [8]. These factors are listed in Table H-76. These numbers are converted into pounds per gross tons-miles transported.

H.5.1.4 Steam-Electric Power Plants. Coal is burned in a wide variety of furnaces to produce heat and steam. Coal-fired furnaces range in size from small, hand-fired units with capacitites of 10 to 20 pounds of coal per day to large, pulverized coal-fired units which may burn 300 to 400 tons of coal per hour. Based on emission factors listed in

[10]Acres of pasture were assumed to be equal to hay in productivity; 241 acres reflects total of 150 acres allocated to hay production plus 91 acres allocated to pasture.

TABLE H-73

PRODUCTIVITY LOSSES FOR NATURAL ECOSYSTEMS

Vegetation	Acres	Rate of Production	Potential Loss
Range	7,463	6.7 Tons/Acre	50,000 Tons
Upland Forest	73	8.0 Tons/Acre	600 Tons
Bottomland (Forest-Wetland)	364	5.4 Tons/Acre	1,970 Tons

TABLE H-74

POTENTIAL LOSS OF WILDLIFE DUE TO HABITAT LOSS

Population	Estimated Density	Acres	Total Individuals Lost
Small Mammals	9 Individuals/Acre	8,446(a)	76,000
Song Birds	1 Individual/Acre	8,446	8,400
Game Birds	0.03 Individual/Acre	8,446	250
Predators	0.002 Individual/Acre	8,446	17
Amphibians/Reptiles	2.5 Individual/Acre	8,446	2,100
Large Game			
Mule Deer	0.005 Individual/Acre	7,463(b)	37
Antelope	0.006 Individual/Acre	7,463(b)	45
White-Tailed Deer	0.03 Individual/Acre	8,446	253

(a) Total acres.
(b) Acres of range.

TABLE H-75

AIR EMISSIONS FROM SURFACE MINING[a]

(pounds)

EMISSION	COAL REGION											
	Northern Appala-chian	Central Appala-chian	Southern Appala-chian	Eastern Inter-ior	Western Inter-ior	Texas	San Juan River w/ Black Mesa	Uinta-S.W. Utah	Green River-Hams Fork	Powder River	Fort Union	Denver Raton Mesa
SOx	600	600	600	900	900	300	500	600	600	600	600	600
NOx	7,800	9,100	9,100	12,500	12,500	4,300	7,200	7,700	7,700	7,700	7,700	7,700
Particulates	300	300	300	1,000	1,000	1,200	900	800	800	800	800	800
CO	4,700	5,600	5,600	7,600	7,600	2,900	4,400	4,400	4,700	4,700	4,700	4,700
Hydrocarbons	800	800	800	1,400	1,400	400	800	800	900	900	900	900

(a) All loadings per 100,000 tons of coal mined

Source: Reference Number 8.

TABLE H-76

AIR EMISSIONS FROM MODES OF TRANSPORTATION
(miles/gallon)

EMISSION	LONG-HAUL RAIL (DIESEL)	FEEDER RAIL	TRUCK	TUG
SO_2	2.85[(a)]	0.57	0.0062	0.29
NO_x	18.5	3.7	0.04	3.0
CO	6.5	1.3	0.063	1.1
HC	4.7	0.94	0.01	0.54
TSP	1.25[(a)]	0.25	0.0029	0.011

Long-haul Rail - unit trains of 100 cars - 10,000 ton capacity.

Feeder Rail - 20 cars of 100 tons coal capacity each - 2,000 ton capacity. 0.1 miles/gallon was assumed.

Truck - 20 tons capacity highway trucks. 150 tons capacity short haul.

Tug - Barges - As many as 36 barges of 1,500 tons capacity each - 54,000 tons per trip and 0.09 miles/gallon used.

(a) Was assumed five times the Feeder Rail amount (five locomotives vs. one).

SOURCES: Reference Numbers 7 and 45.

Table H-77, the loading factors are found in Table H-78.

Steam-electric power plants are assumed to emit pollutants at a rate equivalent to the New Source Performance Standards (NSPS). This assumption is conservative, since NSPS are subject to revision and would presumably be made stricter as control technologies improve. Furthermore, the assumption that facilities emit at NSPS discounts the possibility that many plants may emit at a rate lower than regulations require, especially because of better coal characteristics. Therefore, estimates of the cumulative air impacts should be on the high side.

The emission factors for sulfur oxides and particulate for different geographic units are estimated based on coal characteristics listed in Table H-79.

H.5.1.5 Gasification and Liquefaction Processes. The two important sources of air emissions from coal conversion and combustion plants include:

- Process operations, and
- Auxiliary operations (operations that result in burning fuel).

Process operations occur in enclosed and pressurized systems and emissions from pump seals, joints and flanges, among others. The amount of such emissions would depend upon maintenance operations carried out on the systems, safety controls installed to prevent leakage, collection systems installed, and treatment of vent gases. Since commercial-scale plants have not yet been built in the United States, the information regarding the composition and the amount of some emissions is not readily available in the published data. However, it is assumed that under normal operations some emissions from process operations would not be significant as compared to emissions from auxiliary operations. Therefore, for the purpose of this report, only the auxiliary operations are considered in estimating air emissions associated with coal conversion plants. Unit plants for each of the technologies considered in this report have been defined by the U.S. Energy Research and Development Administration [7].

To determine the emissions from auxiliary operations, it is assumed that all auxiliary power is generated by the burning of coal (or another fuel equivalent). The amount of coal that would be consumed for auxiliary operations by individual unit plants depends upon the type of coal and its Btu content. The amount of coal to be used for auxiliary operations is a fixed portion of coal consumption by the unit plant. Coal consumption by the auxiliary operations is estimated to be:

- Gasification process: 18 percent of total coal consumption (average of Hygas and CO_2 acceptor processes),
- Liquefaction process: 11.2 percent of total coal consumption, based on H-coal (direct hydrogeneration process).

For gasification, an average input feed rate of 16,846 tons of coal per day and 28,454 tons of coal per day for Hygas and CO_2 acceptor processes, respectively, yielded the following emission estimates:

Pollutants	Tons of Emissions per 22640 tons	Tons of Emissions per 100,000 tons
HC	15	66.3
CO	3	13.3
SO_2	5.3	23.4
NO_X	17	75.0
TSP	1.2	5.3

Similarly the emissions for liquefaction were based on the H-Coal process (see Table H-80).

H.5.1.6 Metallurgical Coal. Two processes are used for the manufacture of metallurgical coke, the beehive process and the by-product process.The by-product process accounts for more than 98 percent of the coke produced [8]. Air emissions are based on Tables H-81 and H-82.

H.5.1.7 Delivery. Air emissions in this phase of the coal cycle result from heavy duty, gaseous fueled internal combustion engines which are used in the oil and gas industry for driving compressors in pipeline pressure boosting systems, and in gas distribution. Loading factors for gas lines were derived from publications of the U.S. Enviromental Protection Agency [8] and the U.S. Energy Research and Development Administration [7]. The following factors per 100,000 tons of coal equivalent are obtained:

HC: 0.663 tons
CO: Negligible
SO_X: 0.3315 tons
NO_X: 0.5525 tons
TSP: Negligible

There are no air emissions from the distribution and transmission of electricity or from

TABLE H-77

EMISSION FACTORS FOR BITUMINOUS COAL COMBUSTION
WITHOUT CONTROL EQUIPMENT

Furnace Size, 10^6 BTU/hr. Heat Input [a]	Particulates [b]		Sulfur Oxides [c]		Carbon Monoxide		Hydrocarbons [d]		Nitrogen Oxides	
	lb/Ton Coal Burned	kg/MT Coal Burned	lb/Ton Coal Burned	kg/MT Coal Burned	lb/Ton Coal Burned	kg/MT Coal Burned	lb/Ton Coal Burned	kg/MT Coal Burned	lb/Ton Coal Burned	kg/MT Coal Burned
Greater than 100 (Utility and Large Industrial Boilers)										
Pulverized										
General	16A	8A	38S[c]	19S	1	0.5	0.3	0.15	18	9
Wet Bottom	13A[e]	6.5A	38S	19S	1	0.5	0.3	0.15	30	15
Dry Bottom	17A	8.5A	38S	19S	1	0.5	0.3	0.15	18	9
Cyclone	2A	1A	38S	19S	1	0.5	0.3	0.15	55	27.5
10 to 100 (Large Commercial and General Industrial Boilers)										
Spreader Stoker[f]	13A[g]	6.5A	38S	19S	2	1	1	0.5	15	7.5
Less Than 10 (Commercial and Domestic Furnaces)										
Spreader Stoker	2A	1A	38S	19S	10	5	3	1.5	6	3
Hand-Fired Units	20	10	38S	19S	90	45	20	10	3	1.5

(a) 1 Btu/hr = 0.252 kcal/hr.

(b) The letter A on all units other than hand-fired equipment indicates that the weight precentage of ash in the coal should be multiplied by the value given. Example: If the factor is 15 and the ash content is 10 percent, the particulate emissions before the control equipment would be 10 times 15, of 160 pounds of particulate per tons of coal (10 times 8, or 80 kg of particulates per MT of coal).

(c) S equals the sulfur content (see footnote b above).

(d) Expressed as methane.

(e) Without fly-ash reinjection.

(f) For all other stokers use 5A for particulate emission factor.

(g) Without fly-ash reinjection. With fly-ash reinjection use 20A. This value is not an emission factor but represents loading reaching the control equipment.

SOURCE: Reference Number 7.

TABLE H-78

AIR EMISSIONS FROM COAL COMBUSTION

EMISSION	LBS/TONS OF COAL (NO CONTROLS)[a] (Tons/100,000 tons)		CALCULATED TONS/100,000 TONS[b] OF COAL FIRED (WITH CONTROLS)
HC	0.3	(15)	15
CO	1.0	(50)	50
SO_2	38S	(1900S)	95S
NO_x	18	(900)	450
TSP	16A	(800A)	8A

(a) The letter A on all units other than hand-fired equipment indicates that the weight percentage of ash in the coal should be multiplied by the value given. Example: If the factor is 15 and the ash content is 10 percent, the particulate emissions before the control equipment would be 10 times 15, or 160 pounds of particulate per tons of coal (10 times 8, or 80 kg of particulates per MT of coal). S equals the sulfur content.

(b) Assumes 95 percent SO_x control, 99 percent TSP control, 50 percent NO_x control, and 0 percent CO and HC control.

Source: Reference Number 7.

TABLE H-79

COAL CHARACTERISTICS BY REGION

CHARACTERISTIC	NORTHERN APPALACHIAN	CENTRAL APPALACHIAN	SOUTHERN APPALACHIAN	EASTERN INTERIOR	WESTERN INTERIOR	TEXAS	SAN JUAN RIVER (including Black Mesa Field)		UINTA-S.W. UTAH	GREEN RIVER-HAMS FORK	POWDER RIVER	FORT UNION	DENVER-RATON MESA	
% Surface Mining[a]	43	40	37	75	75	100	63		0	100	100	100	20	
Ash Sulfur ratio (%) by weight[b]	10:1.7	8:2.2	9:1.1	11:2.8	13:4.2	9:0.8	San Juan River 9:0.8	Black[c] Mesa Field 15:0.9	8:1.0	5:0.6	9:0.5	7:0.4	Denver 6:0.3	Raton Mesa 13:0.5
Geographic Units	PA OH WV (A) MD	WV (B) VA KY (A) TN (A)	TN (B) GA AL	IA (A) IL IN KY (B)	IA (B) MO, KS AR (A) OK, NE	TX AR (B) LA	NW (A) CO (B) UT (B)	AZ	CO (C) UT (C)	CO (A) WY (B) ID UT (A)	MT (A) WY (A)	MT (B) ND SD	CO (D)	CO (D) NM (B)

(a) Source: Reference Number 46.

(b) Source: Reference Numbers 15, 47, and 48.

(c) Arizona State is not included in the San Juan River Region.

TABLE H-80

AIR EMISSIONS FROM COAL LIQUEFACTION PLANTS

AIR POLLUTANTS	EMISSION LEVELS	
	Tons/20,773 Tons of Coal[(a)]	Tons/100,000 Tons of Coal
HC	-	10.7
CO	1.8	8.7
SO_2	18	68.7
NO_x	10.5	50.4
TSP	0.2	1.0

(a) Coal Feed: 20,773 Tons per Day.

Source: Reference Number 8.

TABLE H-81

EMISSION FACTORS FROM METALLURGICAL COKE MANUFACTURE WITH CONTROLS [a]

Type of operation	Particulates		Sulfur dioxide [c]		Carbon monoxide		Hydrocarbons [b]		Nitrogen oxides (NO_2)		Ammonia	
	lb/ton	kg/MT	lb/ton	kg/MT	lb/ton	kg/MT	lb/ton	kg/MT	lb/ton	kg/MT	lb/ton	kg/MT
By-product coking												
Unloading	0.4	0.2	-	-	-	-	-	-	-	-	-	-
Charging	1.5	0.75	0.02	0.01	0.6	0.3	2.5	1.25	0.03	0.015	0.02	0.01
Coking cycle	0.1	0.05	-	-	0.6	0.3	1.5	0.75	0.01	0.005	0.06	0.03
Discharging	0.6	0.3	-	-	0.07	0.035	0.2	0.1	-	-	0.1	0.05
Quenching	0.9	0.45	-	-	-	-	-	-	-	-	-	-
Underfiring	-	-	4	2	-	-	-	-	-	-	-	-
Beehive ovens	200	100	-	-	1	0.5	8	4	-	-	2	1

(a) Emission factors expressed as units per unit weight of coal charged.

(b) Expressed as methane.

(c) The sulfur dioxide factor is based on the following representative conditions: (1) sulfur content of coal charged to oven is 0.8 percent by weight; (2) about 33 percent by weight of total sulfur in the coal charged to oven is transferred to the coke-oven gas; (3) about 40 percent of coke-oven gas is burned during the underfiring operation and the remainder is used in other parts of the steel operation where the rest of the sulfur dioxide is discharged - about 6 lb/ton (3 kg/MT) of coal charged; and (4) gas used in underfiring has not been desulfurized.

Source: Reference Number 7.

TABLE H-82

AIR EMISSIONS FOR COKE PRODUCTION

EMISSIONS	LBS/TONS OF COAL	TONS/100,000 TONS OF COAL BURNED	
		WITHOUT CONTROL	WITH CONTROL
HC	4.2	210	210
CO	1.27	63.5	63.5
SO_2	4.02	202.5	10.1
NO_x	0.04	2	1.0
TSP	3.5	175	1.8

Source: Derived from Reference Number 7.

electrically driven pumps that operate gas or liquid pipelines.

H.5.2 Water Use

Water is a major resource required in coal development. It is required in (1) mining operations and revegetation, (2) coal preparation, (3) transportation, and (4) conversion processes. The largest water consumption is the evaporation of water used in cooling and in pollution control. On a per-unit Btu basis, more water is evaporated for cooling electric power generation plants than in synfuel processes [9].

H.5.2.1 Recovery and Extraction. The principal categories that consume water in coal mining are dust control for roads, mines, and embankments and revegetation of reclaimed areas. However, the mine location and the type of mine, surface or underground, would strongly influence the quantity of water consumed.

Water sprayed for dust control in the mine and on the road are based on rainfall and evaporation rates and are calculated based on area disturbed, evaporation rate, rainfall rate, and wetted area rate.

Using the above relationship, and based upon the evaporation rates of:

(1) 45 inches/year for Fort Union Coal Region;

(2) 54 inches/year for Green River-Hams Fork and Denver-Raton Mesa (GR/Denver)

(3) 61 inches/year for San Juan River and Uinta-Southwestern Utah (SJ/Uinta)

(4) 49 inches/year for Powder River Coal Region,

The water requirements would be:

	lb of water/lb of coal mined (surface)	acre-ft/100,000 tons
Fort Union	0.055	4.047
GR/Denver	0.038	2.796
SJ/Uinta	0.052	3.827
Powder River	0.047	3.459
Eastern Areas	0.03	2.208

The loading factor for surface mining results from adding 0.0306 lb water per lb of coal for revegetation. It is also assumed that 75 percent of the water used for revegetation and 100 percent of the water used for dust control evaporates. Therefore, the effluent loading factor for surface mining is (0.25 multiplied by 2.252) or 0.56 acre-ft per 100,000 tons. This methodology results in the following loading factors for the extraction phase of the coal cycle (see Table H-83).

H.5.2.2 Coal Cleaning (Beneficiation). In coal preparation plants, dust is generated during loading and unloading, breaking, conveying, crushing and general screening, and storage. Water is used to control fugitive dust, and to wash the coal to lower the ash and sulfur content. Jigging is used in over one-half of all coal-washing facilities. The water loading factor for crushing and screening is one lb of water/50 lb. of coal or 1.5 acre-ft/100,000 tons of coal [10]. For mechanically cleaned coal most of the wet washing is done by the jigging process (63 percent in 1975). The amount of water needed is 270 gpm per 696 TPH cleaned, or 7.12 acre-ft/100,000 tons cleaned which is divided as follows: 3.12 acre-ft/100,000 tons evaporative, 4.0 acre-ft/100,000 tons effluent.

H.5.2.3 Transportation. The transportation of coal via slurry pipeline consists of pumping finely powdered coal mixed with water. By assuming 50 percent by weight water use, then 100,000 tons of coal would require 50,000 tons or 36.8 acre-ft, of water.

H.5.2.4 Steam Electric. The amount of coal consumed by 3,000 MWe power plant is 8,154,255 tons/year, and the annual water requirements for the plant are 28,000 acre-ft/year [9]. Thus, water required per 100,000 tons of coal is 343 acre-ft. Of the 343 acre-ft, 90 percent is evaporated (309 acre-ft) and the remaining 10 percent (34 acre-ft) is effluent.

H.5.2.5 Synthetic Gas and Liquid. Loading factors were derived from a publication of the U.S. Energy Research and Development Administration [7]. The water make-up per 100,000 tons coal gasified is 179 acre-ft, the effluent portion of which is 46 acre-ft. The water make-up per 100,000 tons of coal liquified is 147 acre-ft, the effluent portion of which is 43 acre-ft.

H.5.2.6 Coke Plant. The water use in the by-product process for the manufacturing of coke is mostly for quenching coke, and for cooling purposes. Cooling water use is 107 gal/ton coke and quench water use is 350 gal/ton coke of which 123 gallons are evaporative and 227 gallons are effluent. Therefore, total water make-up is: 107 +

TABLE H-83

WATER LOADING FACTORS FOR EXTRACTION PHASE OF COAL CYCLE

COAL REGION	SURFACE EFFLUENT	SURFACE (a)	U.G. (b)	U.G. EFFLUENT (c)
Fort Union	0.56	6.299	3.68	1.84
Green River-Hams Fork/ Denver-Raton Mesa	0.56	5.048	3.68	1.84
San Juan River/ Uinta-Southwestern Utah	0.56	6.079	3.68	1.84
Powder River	0.56	5.711	3.68	1.84
Other Regions	0.56	4.460	5.88 (d)	2.94

Water requirement for miners is included in the socioeconomic section.

(a) Water required for dust control and revegetation.
(b) For underground mining 50 lb./1,000 lb. coal or 3.68 acre/ft./100,000 tons of coal.
(c) Assume 50 percent of water used is effluent.
(d) Source: Reference Number 50.

350 = 457 gal/ton coke of which 123 gal/ton evaporate and 334 gal/ton are effluent [11]. Converting the above to acre-ft/100,000 tons of coal and assuming 70 percent conversion from coal to coke [12] results in the following loading factors:

- Water make-up: 457 gal/ton coke or 200.3 acre-ft/100,000 tons of coal
- Effluent water: 123 gal/ton coke or 53.9 acre-ft/100,000 tons of coal used, and
- Evaporative water: 334 gal/ton coke or 146.4 acre-ft/100,000 tons of coal used.

H.5.2.7 Delivery. There are no water uses in this phase of the coal cycle.

H.5.3 Acreage Disturbed

H.5.3.1 Surface mining. The number of acres required to produce 100,000 tons of coal is based on average coal seam thickness and average yield per acre-foot of seam. The calculations for the Colorado-Uinta Coal Region are: 100,000 tons of coal divided by (11 feet (seam thickness) times 1,750 tons/acre-ft) which equals 5.2 acres.

Regional variations in average coal seam thickness produce different loading factors that are shown on individual loading factor sheets. Acres disturbed by underground mining operations are negligible.

H.5.3.2 Coal Cleaning (Beneficiation). A loading factor for land required for coal cleaning was derived from a 1,000 ton/hour (24,000 ton/day) plant sited on 75 acres of land [49]. This loading factor is 0.85 acres/100,000 tons coal cleaned.

H.5.3.3 Rail Transportation. A loading factor for rail transport of 32.4 acres/mile was derived from an average railroad right-of-way width of 268 feet [7].

H.5.3.4 Truck Transportation.
A loading factor for land required for truck traffic was derived from average right of way width in a typical roadway network [7]. An average right-of-way width of 75 feet would take 9.1 acres of land per mile of roadway.

H.5.3.5 Coal Slurry Pipeline. One pipeline (48 inch diameter) could require up to 13 acres of land per mile, while two pipelines sharing a common right of way could require up to 15 acres per mile [7]. Additional land would be required for support facilities such as pumping stations and coal slurry dumping basins. For a coal slurry pipeline, each pump station, including dump basin and water reservoir would require about 40 acres per 100 miles of line [13].

H.5.3.6 Steam Electric. A loading factor for a steam-electric generating plant was derived based on the assumption that 500 acres of land is required by a plant which burns 10,000 tons a day [7]. This loading factor is 13.6 acres per 100,000 tons of coal mined.

H.5.3.7 Synthetic Gas. A loading factor for a synthetic gas plant was derived based on the assumption that 900 acres of land are required by a plant that consumes 22,640 tons of coal per day [7]. This loading factor is 10.9 acres per 100,000 tons of coal mined.

H.5.3.8 Synthetic Liquid. A loading factor for a synthetic liquid plant was derived based on the assumption that 475 acres of land would be required by a plant that consumed 20,773 tons of coal per day [7]. This loading factor is 6.3 acres per 100,000 tons of coal mined.

H.5.3.9 Coke Plants. A loading factor for a metallurgical (coking) plant was derived based on the assumption that 60 acres of land would be required by a plant that consumed 10,000 tons of coal each day [14] . This loading factor is 1.89 acres per 100,000 tons of coal mined.

H.5.3.10 Transmission Lines. A loading factor of 18.2 acres per mile was derived for a transmission line based on an average right-of-way of 150 feet [7].

H.5.3.11 Liquid and Gas Pipelines. A loading factor for pipelines of 15 acres per mile was derived based on an average right-of-way width of 125 feet [7].

H.5.4 Solid Wastes

H.5.4.1 Recovery and Extraction. For underground mining, the amount of inactive wastes generated is approximately three percent of the coal extracted [15].

For surface mining, solid wastes generated are returned to mining pits. Active wastes are not removed until the coal cleaning phase.

H.5.4.2 Coal Cleaning (Beneficiation). Data used to estimate the amount of solid waste generated during crushing and screening and mechanical

cleaning were provided in [12] and [15]. The amount of solid waste generated by crushing and screening assumed to be equally proportional to the mechanical cleaning waste data.[12] Also, national mechanical cleaning data show that the ratio of solid waste to clean coal is 40 percent [12]. Therefore, where no data are available for mechanically cleaned coal, the 40 percent ratio was used.

Data tabulated in Table H-84 were taken from the two sources listed above or derived according to the previously mentioned assumption.

Waste values are multiplied by 1,000 to yield tons of solid waste per 100,000 tons of coal mined. For example, the loading factors for Alabama (Southern Appalachian Coal Region) are 15,972 and 19,775 ton per 100,000 tons of coal for crushing and screening, and mechanically cleaned coal, respectively.

H.5.4.3 Transportation. No solid waste is generated during coal transportation activities.

H.5.4.4 Conversion. The quantity of inert and active wastes generated during coal conversion is related to the ash and sulfur content of the coal. Ash sulfur ratios were determined in Table H-85 [7, 16]

H.5.4.5 Steam/Electric Plants. Inert (ash) and active (sludge) solid wastes are produced at a rate of 10,429 and 11,756 tons, respectively, per 100,000 tons of coal converted when using coal having 12 percent ash and three percent sulfur content coal [17]. Assuming a directly proportional relationship between ash, sulfur content and solid waste generation, Table H-86 presents quantities of inert and active wastes produced per 100,000 tons of coal mined.

For example, the loading factor for Alabama (Southern Appalachian Coal Region) is 7,822 tons of inert waste per 100,000 tons of coal burned.

H.5.4.6 High Btu Gasification. Coals with an ash : sulfur ratio of 10.8 percent to 3.9 percent are known to yield 2,155 tons of inert solid waste (ash) and negligible amounts of active waste per 16,846 tons of coal processed [7]. Assuming a directly proportional relationship between ash content and solid waste generation, Table H-87 presents estimates of quantities of inert wastes produced per 100,000 tons of coal mined.

H.5.4.7 Low Btu Gasification. Coals with an ash to sulfur content ratio of 7.2 percent to 0.6 percent are known to yield inert (ash) and active (dolomite and sulfur compounds) solid wastes at a rate of 2,583 and 1,860 tons, respectively, per 28,434 tons of coal processed [7]. Assuming a directly proportional relationship between ash and sulfur content and solid waste generation, Table H-88 presents estimates of quantities of inert and active wastes produced per 100,000 tons of coal processed.

High and low Btu values were averaged to obtain gasification loading factors (See Table H-89). For example, the loading factor for Alabama (Southern Appalachian Coal Region) is 10,432 tons of inert waste for 100,000 tons of coal (10,064 plus 10,800 divided by 2).

H.5.4.8 Synthetic Liquid. Coals with an ash to sulfur ratio of 9.12 percent to 4.45 percent are known to yield 2,015 tons of inert solid waste (slag, soot) per 20,773 tons of coal processed [7].

Active wastes (dolomite, sulfur compounds) are generated at a rate of 1,860 tons per 20,773 tons of coal processed. Assuming a direct proportional relationship between ash and sulfur content and solid waste generation, Table H-90 presents estimates of quantities of inert and active wastes produced per 100,000 tons of coal mined.

For example, the loading factor for Alabama is 9,572 tons of inert waste per 100,000 tons of coal liquefied [2,015 times 100,000 times 9 divided by (20,773 times 9.12)].

H.5.4.9 Coke Plant. During coke making, 200 acre-feet of water are normally required per 100,000 tons of coal processed [11]. Of this, about 146.4 acre-feet become effluent. The average concentration of suspended sediments in effluent is approximately 50 ppm solids. Other solids generated are ash and slag from the coking process. Therefore, tons of solid are calculated to be 1,985 tons per 100,000 tons of coal processed.

H.5.4.10 Delivery. No solid wastes would be generated during delivery phase of the coal cycle.

[12]The amount of solid waste from mechanical cleaning divided by coal cleaned mechanically equals the solid waste from crushing and screening divided by coal crushed and screened.

TABLE H-84

COAL CLEANING DATA

(1000 tons)

	Col.1 Total Coal Produced (Mined)	= Col.2 Mechanically Cleaned Coal	+ Col.3 Solid Waste	+ Col.4 Non-Mech. Cleaned Coal	+ Col.5 Solid Waste	+ Col.6 Non-cleaned Coal	Col.3 / Col.1 Waste From Mech.Cleaning (% of Total Coal Produced)	Col.5 / Col.1 Waste From Non-Mech. Cleaning (% of Total Coal Produced)
ALABAMA	35,144	11,228	6,950	8,966	5,550	2,450	19.775	15.792
ARIZONA	9,780	0	0	6,986	2,794	0	0	28.568
ARKANSAS	664	211	84	230	92	47	12.650	13.855
COLORADO	11,400	2,043	817	5,911	2,364	265	7.167	20.737
GEORGIA	97	0	0	57	23	17	0	23.711
ILLINOIS	78,679	45,120	14,872	12,957	4,270	1,460	18.902	5.427
INDIANA	32,271	19,402	5,585	5,425	1,562	297	17.306	4.804
IOWA	859	0	0	593	237	29	0	27.590
KANSAS	667	471	188	0	0	8	28.186	0
KENTUCKY:								
Eastern	116,978	23,764	9,369	51,626	20,353	11,866	8.009	17.399
Western	69,908	19,814	5,938	25,404	7,613	11,139	8.494	10.890
MARYLAND	3,430	137	55	1,923	769	546	1.603	22.420
MISSOURI	7,192	1,478	591	2,407	963	1,753	8.217	13.390
MONTANA	30,871	0	0	22,044	8,818	9	0	28.564
NEW MEXICO	12,279	1,016	406	7,769	3,108	0	3.301	25.270
NORTH DAKOTA	11,090	0	0	6,437	2,575	2,078	0	23.219
OHIO	68,634	14,108	7,742	25,732	14,121	6,931	11.28	20.574
OKLAHOMA	3,968	601	240	2,139	856	32	6.048	21.572
PENNSYLVANIA	113,973	42,572	17,600	29,595	12,235	11,971	15.442	10.735
TENNESSEE	10,964	1,642	657	5,253	2,101	1,311	5.992	19.163
TEXAS	15,296	0	0	10,734	4,294	268	0	28.073
UTAH	9,738	3,444	1,378	3,498	1,399	19	14.151	14.366
VIRGINIA	48,064	12,875	5,150	18,511	7,404	4,124	10.715	15.404
WASHINGTON	5,237	3,735	1,494	0	0	8	28.528	0
WEST VIRGINIA	150,790	63,139	25,256	40,628	16,251	5,516	16.749	10.777
WYOMING	32,574	124	50	21,799	8,720	1,881	0.153	26.770

Source: Reference Numbers 11 and 14.

TABLE H-85

ASH : SULFUR RATIOS

COAL REGION	ASH: SULFUR RATIOS BY WEIGHT PERCENT
Northern Appalachian	10 : 1.7
Central Appalachian	8 : 2.2
Southern Appalachian	9 : 1.1
Eastern Interior	11 : 2.8
Western Interior	13 : 4.2
Texas	9 : 0.8
Powder River	9 : 0.5
Fort Union	7 : 0.4
Green River-Hams Fork	5 : 0.6
San Juan River	9 : 0.8
Black Mesa Field	15 : 0.9
Uinta-Southwestern Utah	8 : 1.0
Denver	6 : 0.3
Raton Mesa	13 : 0.5

Source: Reference Numbers 15 and 8.

TABLE H-86

INERT AND ACTIVE WASTES PRODUCED BY STEAM-ELECTRIC PLANTS

COAL REGION	SOLID WASTE (TONS) INERT	ACTIVE
Northern Appalachian	8,691	6,662
Central Appalachian	6,953	8,621
Southern Appalachian	7,822	4,310
Eastern Interior	9,560	10,972
Western Interior	11,298	16,458
Texas	7,822	3,135
Powder River	7,822	3,135
Fort Union	13,036	3,527
Green River-Hams Fork	6,953	3,919
San Juan River	4,345	2,351
Black Mesa Field	7,822	1,959
Uinta-Southwestern Utah	6,084	1,567
Denver	5,214	1,176
Raton Mesa	11,298	1,959

Source: Reference Numbers 8 and 15.

TABLE H-87

PROJECTED INERT SOLID WASTE PER HIGH BTU GASIFICATION PLANT

COAL REGION	INERT SOLID WASTE (tons)
Northern Appalachian	11,183
Central Appalachian	8,946
Southern Appalachian	10,064
Eastern Interior	12,301
Western Interior	14,537
Texas	10,064
Powder River	10,064
Fort Union	7,828
Green River-Hams Fork	5,591
San Juan River	10,064
Black Mesa Field	16,774
Uinta-Southwestern Utah	8,946
Denver	6,710
Raton Mesa	14,537

Source: Reference Numbers 8 and 15.

TABLE H-88

PROJECTED INERT AND ACTIVE WASTE PER LOW BTU GASIFICATION PLANT

COAL REGION	INERT SOLID WASTE (TONS)	ACTIVE SOLID WASTE (TONS)
Northern Appalachian	12,001	1,279
Central Appalachian	9,601	1,656
Southern Appalachian	10,800	828
Eastern Interior	13,200	2,108
Western Interior	15,601	3,161
Texas	10,800	602
Powder River	10,800	376
Fort Union	8,401	300
Green River-Hams Fork	6,000	452
San Juan River	10,800	602
Black Mesa Field	18,002	677
Uinta-Southwestern Utah	9,601	752
Denver	7,201	225
Raton Mesa	15,601	377

Source: Reference Numbers 8 and 15.

TABLE H-89

AVERAGE INERT AND ACTIVE WASTES PER GASIFICATION PLANT

COAL REGION	INERT SOLID WASTE (TONS)	ACTIVE SOLID WASTE (TONS)
Northern Appalachian	11,592	1,279
Central Appalachian	9,274	1,656
Southern Appalachian	10,432	828
Eastern Interior	12,750	2,108
Western Interior	15,069	3,161
Texas	10,432	602
Powder River	10,432	376
Fort Union	8,114	300
Green River-Hams Fork	5,796	452
San Juan River	10,432	602
Black Mesa Field	17,388	677
Uinta-Southwestern Utah	9,274	752
Denver	6,956	225
Raton Mesa	15,069	377

Source: Reference Numbers 8 and 15.

TABLE H-90

INERT AND ACTIVE WASTE FOR SYNTHETIC LIQUEFACTION PLANTS

COAL REGION	INERT SOLID WASTE (TONS)	ACTIVE SOLID WASTE (TONS)
Northern Appalachian	10,636	3,420
Central Appalachian	8,509	4,427
Southern Appalachian	9,572	2,213
Eastern Interior	11,700	5,634
Western Interior	13,827	8,451
Texas	9,562	1,610
Powder River	9,572	1,006
Fort Union	7,445	805
Green River-Hams Fork	5,318	1,207
San Juan River	9,572	1,610
Black Mesa Field	15,954	1,811
Uinta-Southwestern Utah	8,509	2,012
Denver	6,381	604
Raton Mesa	13,827	1,006

Source: Reference Numbers 8 and 15.

H.5.5 Fatalities

H.5.5.1 Recovery and Extraction. The average surface mining fatality rate is 0.011 fatalities per 100,000 tons mined; the average deep mining fatality rate is 0.04 per 100,000 tons mined. These loading factors were derived from Table 39 in Injury Experience in Coal Mining 1975, Mining Enforcement and Safety Administration [17].

H.5.5.2 Coal Cleaning (Beneficiation). Loading factors were based on the following assumptions:

- 1975 total coal processed = 374.1 x 10^6 tons (raw coal).
- 1975 total man-hours worked = 29.130 x 10^6 hours.
- Averaged processed coal per man-hour = 12.84 tons/man-hour.
- Average man-hours necessary to process 100,000 tons (raw coal) = 100,000 divided by 12.84 = 7787 man-hours.
- Average fatality rate (coal cleaning plants) = 0.31 fatalities per 10^6 man-hours or 0.031 fatalities per 100,000 man-hours.
- National average fatalities per 100,000 tons of raw coal processed = (7786 divided by 10^5) x 0.031 = 0.0002.
- For crushing and screening plants fatality rates are assumed to be 1/3 those for mechanical plants, or 0.00005.

H.5.5.3 Transportation. Loading factors were based on the following assumptions:

- 0.2135 fatalities per 10 billion gross ton-miles traveled by unit trains.
- 47.2 fatalities per 10 billion gross ton-miles traveled by trucks.

These factors were estimated on the methodology set out by Bliss [18] and data supplied by Banks [19].

H.5.5.4 Conversion. The steam electric power plant fatality rate was derived from fatality data presented by Bliss [18] and equals 0.00006 fatalities per 100,000 tons of coal consumed.

Fatality rates for gasification and liquefaction plants are 0.0017 fatalities per 100,000 tons used in gasification plants, and 0.0011 fatalities per 100,000 tons used in liquefaction plants [7].

H.5.5.5 Coke Plants. Coke oven fatalities are estimated to equal 0.001 per 10^5 tons of coal loaded into coke ovens. This loading factor is derived from standards promulgated by the U.S. Department of Labor [20, 21].

H.5.6 Disabling Accidents

H.5.6.1 Recovery and Extraction. Estimates of disabling accidents resulting in man-days lost were developed for each coal production state. In states where data was insufficient to make accurate estimates of disabling accident rates per 100,000 tons mined, national data was substituted. The data supporting the accident loading factors is contained in Reference 17.

H.5.6.2 Beneficiation. The estimates of total disabling accidents in the beneficiation sector were derived from the same data source as for mining and extraction.

H.5.6.3 Transportation. Estimates of coal-related disabling accidents in the rail and truck transport sectors of the coal cycle were derived from data in Reference 18. To simplify estimation processes, it was assumed that the level of disabling accidents in the slurry pipeline sector of the coal cycle was statistically equivalent to zero.

H.5.6.4 Conversion. Estimates of the level of disabling accidents occurring in the various conversion sectors of the coal cycle were derived from estimates and data in Reference 18.

H.5.7. Man-days Lost

Estimates of the man-days lost as a result of the disabling accidents projected in the various sectors of the coal cycle are based upon data in References 17 and 18.

It was assumed that:

- Each fatality was the equivalent of 6,000 man-days lost
- Disabling accidents in the mining and beneficiation sectors resulted in an average of 141 man-days lost per accident.
- Rail-sector disabling accidents resulted in an average of 59.5 man-days lost per accident.
- Truck-transport sector disabling accidents resulted in an average of 45.4 man-days lost per accident
- Based upon National Safety Council estimates [51], an average of 102 man-days are lost per accident occurring in other phases of the coal cycle.

H.5.8 Operating Energy

The operating energy consumed in the coal fuel cycle includes:

H.5.8.1 Recovery and Extraction. The overall operating energy required for coal extraction is four percent of the Btu content of marketable coal [23, 24].

Based on an average of 22 million Btus per ton of coal, the loading factor for coal extraction is 0.088 trillion Btus/100,000 tons of coal [$0.04(22x10^6 x10^5)$].

H.5.8.2 Refining and Processing (Beneficiation). The operating energy required for crushing and screening coal is 0.7 percent, and for mechanically cleaned and dried coal is 4.6 percent of the Btu content of coal [23, 25]. Therefore, the loading factor for coal crushing and screening is 0.0154 trillion Btus/100,00 tons of coal [$0.007\ (22x10^6 x10^5)$], and for mechanical cleaning is 0.1 trillion Btus/100,000 tons of coal [$0.046\ (22x10^6 x10^5)$].

H.5.8.3 Coal Transport. The operating energy required in the transportation sector is measured in Btus consumed per ton-mile transported and is a function of the mode of transportation as follows [32]:

- 670 Btus/ton-mile for rail transport or or 0.670 trillion Btus/billion ton-mile;
- 680 Btus/ton-mile for barge transport or 0.680 trillion Btus/billion ton-mile;
- 2800 Btus/ton-mile for truck transport or 2.8 trillion Btus/billion ton-miles, and
- 450 Btus/ton-mile for slurry pipe line, or 0.450 trillion Btus/billion ton-miles.

To account for empty return trips of transportation equipment, it is necessary to adjust the above numbers to Btus consumed per gross ton-mile transported. Thus, the loading factors are [19]:

- 0.67 divided by 1.78 or 0.3764 trillion Btus/billion ton-miles for rail transport;
- 0.68 divided by 1.43 or 0.4755 trillion Btus/billion ton-miles for barge transport;
- 2.8 divided by 2.04 or 1.3725 trillion Btus/billion ton-miles for truck transport, and
- 0.45 divided by 1.0 or 0.45 trillion Btus/billion ton-miles for slurry pipelines.

H.5.8.4 Coal Conversion and Utilization. The operating energy measured in Btu input to coal conversion facilities is: three percent for steam electric power plants [24], 2.1 percent for gasification plants, 0.9 percent for liquefaction plants [7], and 2.7 percent for coke plants [11]. Based on 22 million Btus per ton of coal, the loading factors are:

- [.03(22 times 10^6 times 10^5)] or 0.066 trillion Btus/100,000 tons of coal for steam electric power plants;
- [0.021(22 times 10^6 times 10^5)] or 0.046 trillion Btus/100,000 tons of coal for gasification plants;
- [$0.009(22x10^6\ x10^5$)] or 0.019 trillion Btus/100,000 tons of coal for liquefaction plants, and
- [$0.027(22x10^6\ x10^5$)] or 0.06 trillion Btus/100,000 tons of coal for coke plants.

H.5.8.5 Delivery. Losses in transmission and distribution facilities occur between the electric generating plant busbar and the appliance or piece of equipment which operates on electricity. These losses are approximately nine percent of the total electricity transmitted. However, substation and transformers use only one percent of the electric load transmitted [6]. Therefore, the loading factor is 0.022 trillion Btus/100,000 tons of coal. To operate liquid pipelines to and from refineries, 2.3 percent of the equivalent heat content of oil is consumed; and to operate gas pipelines, 2.9 percent of the equivalent heat content of gas is consumed [23]. Therefore, the loading factors are: 0.0506 trillion Btus per 100,000 tons of coal equivalent for oil lines, and 0.0638 trillion Btus per 100,000 tons of coal equivalent for gaslines.

H.5.9 Operation and Construction Employment

H.5.9.1 Recovery and Extraction. The loading factor is based on peak employment during construction of a 5.6 million tons per year mine and is estimated to be 180 workers. Thus, 3.21 construction workers would be required per 100,000 tons annual output.

Approximately 50 percent more workers are required for underground mine construction, i.e., 4.8 construction workers per 100,000 ton annual output.

Loading factors for direct operation workers are:

- Underground Miners — Loading factors for underground miners are derived by utilizing

the number of miners required to mine 100,000 tons of coal per day [7] divided by 365 days per year. These numbers vary according to mine characteristics and, therefore, yield different loading factors for each of the coal regions. In Alabama, the loading factor is 37.8.

- Surface Miners — The same methodology was applied utilizing the number of surface miners required to mine 100,000 tons of coal per day divided by 365 varying by region [7]. In Alabama, the loading factor is 17.8.

H.5.9.2 Refining and Processing. During the construction of a coal preparation plant, the peak construction force is 150 men.

In 1975, there were 388 mechanical cleaning plants. They cleaned a total of 374.1 x 10^6 tons (raw) coal. Average yearly tonnage cleaned per plant equals 964,180 = 9.64 in 100,000 ton coal units [23, 27]. 150 man-years peak construction effort divided by 9.64 = 15.6 man-years of construction effort per 100,000 ton unit of coal. For crushing and screening plants, assume 1/2 the work force spread over two years. For example, a 75 man peak labor force divided by 9.64 = 7.8 man-years construction effort per 100,000 ton unit of coal crushed and screened [28].

Total man-hours worked in 1975 was 29.13097 x 10^6 hours [29]. Total tonnage cleaned = 374.1 x 10^6 tons. Therefore, 7,812 man-hours are required per 100,000 tons of coal cleaned, or 12.84 tons/man-hours.

Assuming an eight-hour shift and a 365-day work year, one man-year = 2,920 man-hours. Therefore, 2.67 man-years of effort are required to clean a 100,000 ton unit of coal [29, 30].

For crushing and screening plants, operational workers are estimated to be one-third of those for mechanical cleaning plants or 0.9 man-years per 100,000 ton unit of coal.

H.5.9.3 Transportation. Loading factors for direct construction workers are:

- Rail — Construction workers were derived from a U.S. Energy Research and Development publication [8] and equal 300 construction workers per 1,000 miles of track.
- Truck — Highway construction workers were derived from the same publication [8] and equal 170 workers per 1,000 mile system with three years to build.
- Slurry Pipeline — Pipeline construction workers were derived from [13] and equal 4,900 workers per 1,036 miles of pipeline.

Loading factors for direct operation workers are:

- Rail — Rail operator loading factors assume a unit train of 10,000 ton capacity traveling 1,000 miles round trip. Also, a six day turn around time results in approximately 60 trips per year and 110 total operating employees per one million train-miles. These assumptions yield 22 employees per billion gross ton-miles.
- Truck — This factor assumes a 25 ton capacity truck unit traveling 150 miles round trip and three trips per day requiring 1.35 employees per unit or 1,346.4 employees per billion gross ton-miles [31].
- Barge — Barge loading factors assume 21,000 ton capacity (14 barges) per 500 mile round trip and 24 employees per 3.5 day round trip or 44 employees per billion gross ton-miles [31].
- Slurry Pipeline — This factor assumes a capacity of 25 billion ton-miles per year and 239 employees or 10 employees per billion net ton-miles [13].

H.5.9.4 Steam Electric (Construction). Loading factors for steam electric construction workers are based on the assumption of a 1,000 MWe coal fired power plant which consumes 10,000 tons of coal per day [32]. Also, the peak construction work force amounts to 1,400 workers [33]. Using a 100,000 ton unit of coal results in a loading factor of 38.4 workers per 100,000 tons of coal consumed.

H.5.9.5 Synthetic Gas (Construction). Synthetic gas loading factors are derived from data of two gasification plants, one consuming 16,846 tons of coal per day and the other consuming 28,434 tons per day. It also assumes a 1,500 man peak construction work force [8]. These assumptions yield 18.1 workers per 100,000 tons of coal consumed.

H.5.9.6 Synthetic Liquid (Construction). This factor assumes a liquification plant which consumes 20,773 tons of coal per day with a peak construction force of 1,500 workers [8]. This yields an

estimate of 19.73 workers per 100,000 tons of coal consumed.

H.5.9.7 Coke Plants (Construction). The peak labor force for coke oven construction is 180 men [28]. Loading factors are based on:

- Average number of plants under construction = nine million tons of coke capacity/year.
- 9 million tons of coke = 12,857,000 tons of coal.
- 1975 average number of plants = 62.
- 1975 coke production was 56,494,000 tons.
- Therefore, average coke production per plant equals 911,193 tons.
- Therefore, to produce nine million tons, an average of 10 plants is required.
- Total peak construction labor required for 10 plants equals 10 times 180.
- Total construction labor expended = 1,800 divided by 128.57 equals 14.0 man years per 100,000 ton-units. [23, 28, 34].

H.5.9.8 Steam Electric (Operation). Loading factors for steam electric operation workers are based a 1,000 MWe coal-fired power plant which consumes 10,000 tons of coal per day [32]. The operating work force of the plant is 160 employees [32]. These assumptions yield an estimate of 4.38 workers per 100,000 ton coal unit.

H.5.9.9 Synthetic Gas (Operation). Synthetic gas loading factors are derived from averaging data of two gasification plants. One consumes 16,846 tons of coal and the other consumes 28,434 tons per day [8]. Based upon an operating force of 1,000, calculations yield 12.1 workers per 100,000 of coal feed.

H.5.9.10 Synthetic Liquid (Operation). This factor assumes a liquification plant which consumes 20,773 tons of coal per day with an operating force of 1,000 employees [8]. This yields an estimate of 13.15 workers per 100,000 tons of coal feed.

H.5.9.11 Coke Plants (Operation). Assuming a coking efficiency of 70 percent, the average coal used per man-hour equals 2.1938 tons. For 100,000 tons of coal, an estimated 45 man-hours (100,000 divided by 2.1938 equals 45,581.8) would be needed to produce 70,000 tons of coke. This is equivalent to 15.6 full time employees.

Thus, the direct employment multiplier for metallurgical coal (coking) is 15.6 per 100,000 tons of coal used [22].

H.5.9.12 Delivery.

Direct Construction Workers:

- Transmission-line construction workers were estimated to be 300 workers per 100 miles of line [8].
- Pipeline (liquid) construction workers for liquid pipelines were estimated to be 1,150 workers per 1,000 miles of pipeline [8].
- Pipeline (gas) construction workers were estimated to be 1,150 workers per 1,000 miles of pipeline [8].

Direct Operation Workers:

- Transmission Operation workers were estimated to equal 20 workers per 100 miles of line [8].
- Pipeline (liquid) operation workers were estimated to equal 115 workers per 1,000 miles of pipeline [30].
- Pipeline (gas) operation workers were estimated to be 139 workers per 1,000 miles of pipeline [30].

H.6 AGRICULTURAL OPPORTUNITY COST DERIVATION METHODOLOGY

This analysis focuses on estimation of monetary costs of trade-offs made if coal development occurs. It is limited to areas where at least partial market information exists.

The opportunity cost of coal production is equal to foregone outputs that could be obtained from the alternative employment of resources used. These resources include land and other natural resources, labor, and capital. Capital is a highly mobile resource with a national market. With respect to capital, there is very little difference at the margin between returns "with" coal development at a particular location versus "without" coal development. Labor tends to be geographically committed to a far greater degree than capital. Most workers tend to stay in one city or town for long periods of their lives; most usually move only when a substantial change occurs in their lives. Thus, if coal resource development were to decrease employment opportunities significantly, it would be necessary to consider that fact as one of the costs of development. This cost would

then be added to other development costs to obtain the total costs of coal development.

When considering the opportunity cost of labor, we are assessing the value of labor resources in alternative productive uses. Labor resources would freely move within coal development areas and workers could freely choose their employment activity. It is likely that, given the high wages paid in the mining industry, opportunity costs for labor will be less than wages in coal mining and related activities. Under these conditions, opportunity costs will be generated by those who could be employed in the coal mining industry but elect not to do so.

Land resources are totally fixed, both in location and amount. The opportunity costs of land resource use are the value of outputs foregone due to coal development. The most substantial opportunity costs occur in agricultural production. Surface mining will result in substantial losses in agricultural output per acre mined (Table H-91). Values presented in Table H-91 represent the annual gross revenue return per acre to the agricultural sector, by state. Some double counting is inevitable because sales within the farm sector are not netted out.[13] Double counting results in overestimation of the value of final agricultural products produced. The degree of over estimation is related to the interdependence of a region's agricultural sector with respect to both agriculture itself and also other sectors of the economy (e.g., trade, services, etc.).[14]

Although the opportunity cost estimates presented in Table H-91 overstate the time level of such costs, they represent the maximum annual agricultural opportunity cost per acre of land used for production of coal. It is assumed that, in the foreseeable future, rehabilitated land will not yield agricultural output commensurate with premining levels of production. It is anticipated that, for each acre of land required for coal development in each region, the annual opportunity cost approximates the values presented in Table H-91. The estimates presented can be refined in two specific ways.

First, by estimating a single value that can be compared to the total resource value of the coal; and second, by estimating values appropriate to the state within the production region that specify, for the community at-large, the opportunity costs resulting from foregone agricultural outputs as land resources are withdrawn from agriculture and utilized in the production of coal. To make the comparison of the total resource value of coal, it is necessary that the annual agricultural output per acre be converted to a measure of present value. In the course of future analyses, the present value of land used in coal production can be compared to the present value of land in agricultural production. To estimate the present value of land in agriculture, we have estimated the capitalized[15] value of land for each state within the production regions. The capitalized value assumes that the return to farmers as a result of agricultural productive activity is 100 percent of gross returns. This of course, is not true, but by making such an assumption we can estimate the upper bound for the opportunity costs of land in agriculture. Thus, this analytic framework also enables separate estimates of agricultural factor payments and expected values of agricultural opportunity costs. The upper limit of the present value of agricultural opportunity costs of land not including externalities are presented in Table H-92. The application of information on regional earnings in agriculture as a percent of the gross value of agricultural sales reduces the upward bias in the Table H-92 estimates. The resulting value is no longer an upper limit, but, rather, is an estimate of the average agricultural opportunity cost of land.

Regional agricultural earnings used in this analysis are estimated to equal 18 percent of the value of all agricultural products sold for all regions.[16] This is an approximation of the national average and has not been varied among the coal production regions. The loss of these earnings is an additional estimate of agricultural opportunity costs. The generation of information about the level of value-added in agriculture for each coal production area will allow more specific estimates of agricultural earnings and accordingly, opportunity costs. Once calculated, these revised estimates

[13] The use of the national input-output table or a regional input-output table might be used to estimate intra-agricultural transactions.

[14] Input-output models could also be used in this case to estimate sales of other sectors to agriculture.

[15] Capitalized value is computed by dividing the yield of an investment which in this case is taken to be the average value of agricultural output per acre of all land by the interest rate.

[16] Estimated as a simple average of data for Sector 3: meat, animals and miscellaneous livestock products and Sector 5: feed grains, and grass seeds Table C-1 in U.S. Water Resources, Guidelines 5 [35].

TABLE H-91

MAXIMUM AGRICULTURAL OPPORTUNITY COSTS OF MINING, SHOWING CAPITALIZED VALUE OF ALL AGRICULTURAL PRODUCTS SOLD PER ACRE OF ALL LAND (a)
(1974 dollars)

Northern Appalachian	
Pennsylvania	522
Ohio	863
West Virginia	86
Maryland	980
Central Appalachian	
West Virginia	86
Virginia	377
Kentucky	493
Tennessee	353
Southern Appalachian	
Tennessee	353
Georgia	500
Alabama	346
Eastern Interior	
Iowa	1765
Illinois	1308
Indiana	1131
Kentucky	493
Western Interior	
Iowa	1765
Missouri	522
Arkansas	566
Oklahoma	362
Kansas	703
Nebraska	763
Texas	
Texas	336
Arkansas	566
Louisiana	415
Powder River	
Montana	64
Wyoming	47
Green River - Hams Fork	
Colorado	41
Wyoming	26
Idaho	563
Utah	77
Fort Union	
Montana	150
North Dakota	263
South Dakota	99
San Juan River	
Arizona	10
New Mexico	16
Colorado	75
Utah	12
Uinta - Southwestern Utah	
Colorado	45
Utah	58
Denver - Raton Mesa	
Colorado	694
New Mexico	50

(a) Assumes interest rate of 10% - 1974 dollars.

TABLE H-92

MAXIMUM DIRECT AND INDIRECT AGRICULTURAL OPPORTUNITY COSTS OF MINING(a)
(1974 dollars)

Northern Appalachian	
Pennsylvania	799
Ohio	1338
West Virginia	118
Maryland	1499
Central Appalachian	
West Virginia	126
Virginia	535
Kentucky	700
Tennessee	501
Southern Appalachian	
Tennessee	505
Georgia	715
Alabama	516
Eastern Interior	
Iowa	2524
Illinois	1831
Indiana	1663
Kentucky	725
Western Interior	
Iowa	2524
Missouri	809
Arkansas	855
Oklahoma	547
Kansas	1090
Nebraska	1068
Texas	
Texas	501
Arkansas	798
Louisiana	606
Powder River	
Montana	90
Wyoming	68
Green River - Hams Fork	
Colorado	59
Wyoming	39
Idaho	805
Utah	116
Fort Union	
Montana	116
North Dakota	350
South Dakota	132
San Juan River	
Arizona	15
New Mexico	23
Colorado	109
Utah	117
Uinta - Southwestern Utah	
Colorado	65
Utah	69
Denver - Raton Mesa	
Colorado	1055
New Mexico	72

(a)Present sum of the capitalized value of all agricultural products sold per acre of all land from Table H-91 and the indirect component; regional earnings dependent upon agricultural output per acre of all land.

will reflect the wide differences in the agricultural sectors of the various coal producing areas.

To this point in the analysis, externalities (indirect effects) have not incorporated in the estimation of opportunity costs. The next step in the analysis is to examine the indirect consequences of reducing the agricultural land base within each coal region. Such reductions are external to the agricultural sector and are the result of interdependence in regional economies. It is assumed that surface mining will reduce output by the average capitalized value shown in Table H-92 and that "regional final demand" will be also reduced by this amount. While external decreases in output in the agricultural sector are generated by coal mining, e.g., fewer farms result in reduced demand for tractors, in many instances these decreases may be offset by increased coal industry demand for comparable goods and services. The estimates presented in Table H-93 represent the maximum total direct and indirect changes in regional earnings resulting from the use of one acre of land for mining activities. From the estimates presented in Table H-93, it is possible to estimate expected values of total capitalized agriculture opportunity costs including direct and indirect costs within a coal producing region. These estimates are presented in Table H-94.

It must be emphasized that the agricultural opportunity costs presented are estimated for an average acre of land in each coal region, regardless of current use and without knowing the precise location of potential mining activities.

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TABLE H-93

ESTIMATED AGRICULTURAL OPPORTUNITY COSTS OF MINING(a)
(1974 dollars)

Northern Appalachian	
Pennsylvania	144
Ohio	240
West Virginia	21
Maryland	269
Central Appalachian	
West Virginia	22
Virginia	97
Kentucky	126
Tennessee	91
Southern Appalachian	
Tennessee	92
Georgia	129
Alabama	92
Eastern Interior	
Iowa	455
Illinois	329
Indiana	300
Kentucky	131
Western Interior	
Iowa	455
Missouri	146
Arkansas	154
Oklahoma	98
Kansas	197
Nebraska	192
Texas	
Texas	89
Arkansas	143
Louisiana	110
Powder River	
Montana	17
Wyoming	12
Green River - Hams Fork	
Colorado	10
Wyoming	8
Idaho	144
Utah	21
Fort Union	
Montana	38
North Dakota	63
South Dakota	24
San Juan River	
Arizona	3
New Mexico	4
Colorado	20
Utah	3
Uinta - Southwestern Utah	
Colorado	12
Utah	13
Denver - Raton Mesa	
Colorado	190
New Mexico	13

(a) Includes capitalized values of regional agricultural earnings (direct plus indirect) per acre of all land.

TABLE H-94

VALUE OF ALL AGRICULTURAL PRODUCTS SOLD PER ACRE OF ALL LAND

(1974 dollars)

Northern Appalachian	
Pennsylvania	52.24
Ohio	86.28
West Virginia	8.64
Maryland	97.94
Central Appalachian	
West Virginia	8.64
Virginia	37.70
Kentucky	49.33
Tennessee	35.28
Southern Appalachian	
Tennessee	35.28
Georgia	50.04
Alabama	34.59
Eastern Interior	
Iowa	176.52
Illinois	130.76
Indiana	113.09
Kentucky	49.33
Western Interior	
Iowa	176.52
Missouri	52.18
Arkansas	56.57
Oklahoma	36.23
Kansas	70.34
Nebraska	76.26
Texas	
Texas	33.60
Arkansas	56.57
Louisiana	41.48
Powder River	
Montana	6.43
Wyoming	4.68
Green River - Hams Fork	
Colorado	4.14
Wyoming	2.58
Idaho	56.31
Utah	7.70
Fort Union	
Montana	14.95
North Dakota	26.34
South Dakota	9.91
San Juan River	
Arizona	1.03
New Mexico	1.56
Colorado	7.48
Utah	1.20
Uinta - Southwestern Utah	
Colorado	4.50
Utah	4.79
Denver - Raton Mesa	
Colorado	69.37
New Mexico	4.96

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APPENDIX I

EXISTING LEASES AND PRLAs DISCUSSION PAPER

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

MAR 30 1979

Memorandum

To: Under Secretary

Through: Assistant Secretary, Land and Water Resources

From: Director, Office of Coal Leasing, Planning and Coordination

Subject: Discussion paper on Departmental management of existing coal leases and preference right lease applications

I. INTRODUCTION

A major element of any new federal coal management program would be a competitive coal leasing process. Much of the analysis in the Department's draft environmental statement on the federal coal management program focused on this element. Another significant element of the program is how the Department proposes to treat existing leases and pending noncompetitive preference right lease applications. The role of these leases and applications is discussed throughout the draft environmental statement (DES). The purpose of this memorandum is to summarize the material in the statement and other relevant information about this second element of a coal management program to ensure that those who are interested in these matters will have thorough and convenient access to the necessary material. The Solicitor's Office has been asked to give expedited consideration to the legal questions identified in this memorandum, and this office will prepare any necessary issue option documents on the policy issues that are outlined in this memorandum, and that may arise out of the conclusions reached by the Solicitor's Office on the legal questions. The memorandum will first discuss why existing leases and pending lease applications are important to federal coal management and then go on to discuss the specific steps that have been and will be taken in managing them.

A. SIZE OF THE MATTER

As of October 1978, there were 533 federal coal leases containing an estimated 17 billion tons of coal. Sixty-seven percent of these reserves are surface mineable, while thirty-three percent are mineable by underground methods. All but 66 of the 533 leases are located in the six

principal coal regions in the western United States. Table I, taken from Chapter 2 of the DES, shows the region, number of leases, acreage, and amount of coal under lease broken down according to the principal coal areas. In 1977, annual production from these leases was slightly over 50 million tons.

As of March 1976, there were 172 applications for preference right leases pending before the Department, containing an estimated 9.9 billion tons of coal, 3.5 billion tons of which is estimated to be surface mineable, and 6.4 billion tons of which is mineable by underground methods. Table II, also taken from Chapter 2 of the DES, shows the number of applications, the acreage and amount of reserves, again broken down by region.

B. IMPORTANCE TO COAL MANAGEMENT PROGRAM

Forecasts of future coal use in the United States predict that both national coal use and western coal use will increase over the next 15 years. While demand growth rates in these forecasts vary and may change, the certainty of increased demand and the need for increased coal production cannot be denied. Federally-owned coal makes up 25 to 30 percent of all national coal reserves and 60 percent of western coal reserves. It thus has the potential to influence levels and distribution of national coal production.

Only a little more than one percent of federally-owned coal acreage has been leased. Even if no additional coal was competitively leased, however, the estimated 26.9 billion tons of leased coal and coal subject to noncompetitive lease application could significantly add to national coal production. Using the crudest and most optimistic estimate of annual coal production potential from these lands, that is, assuming that all coal can be economically and environmentally mined, the coal in existing leases and pending applications could supply 670 million tons annually for 40 years. A more realistic estimate of production from existing leases is that they are capable of producing in the neighborhood of 360 million tons annually by 1985. The Department calculates from approved and pending mining plans that lessees have planned production of around 310 million tons annually by 1985. Existing preference right lease applications, if granted, would likely produce not more than 100 million tons annually by 1990. By comparison, 1977 production from federal leases was only 50 million tons. The magnitude of this possible increase underscores the importance of focusing on what role these leases and lease applications may play, and what policies and procedures the Department will adopt to ensure that they are managed in an economically and environmentally sound manner.

II. EXISTING LEASES

There are several important issues concerning existing leases. How are they considered in setting regional leasing targets? How will

unsuitability criteria be applied? How do the diligent development and continued operation standards work? Are there any constraints on assigning lease rights? One other important issue, application of the interim and permanent programs adopted under the Surface Mining Control and Reclamation Act, is, of course, addressed very extensively in the environmental statement on that program and in regulations developed to carry out the mandates of that Act. Simply stated, however, operations on all federal leases will comply with that Act unless it authorizes an exception.

A. REGIONAL LEASING TARGETS

An integral part of the preferred alternative is a process to decide how much coal should be leased competitively. The process of setting regional production goals and leasing targets starts with comparisons of likely production from all possible sources, with projections of demand derived from computer models developed and operated by the Department of Energy. It then proceeds with consultations with state governments, the industry and the public to modify the computer-derived estimates with other projections and estimates, and specific reasons for leasing or not leasing certain types of coal or in certain locations. Finally, the environmental and socio-economic impacts of specific levels of leasing-influenced development will be studied for each of the Department's coal regions where leasing might occur. This process requires the Department to have informed estimates of likely production from all lands, including existing leases. The Department will use a variety of outside sources to gather this information, including the information published by the Department of Energy, the National Coal Association, and the Keystone Coal Manual. For existing leases, the Department has relied, and will continue to rely, heavily on estimates from pending and approved mining plan applications as well as inquiries of and conversations with lessees. To make certain that this information is both easily available and accurate, the Department has developed an automated coal data system which, for the first time, centralizes all information on coal leases. The information in the system should contain the best available estimates of planned and potential future production from coal leases.

Table III, taken from Chapter 2 of the DES, is derived from information in the automated coal data system. It is the source of the statistics recited above: that planned 1985 production from coal leases in approved or pending mine plans will be around 310 millions tons per year; and, combined with Table 2-21 in the DES, that likely 1985 production from federal leases will be over 360 million tons per year. These figures are derived from a systematic canvass of all leases existing in early 1978 by the Geological Survey's mining supervisors. Information on potential production was broken down into five lease categories: (1) leases with approved mining plans; (2) leases with approved mining plans to which modifications are pending; (3) leases with mining plans

pending approval; (4) leases on which no mine plan has been submitted, but for which the lessees have discussed a plan with the Geological Survey; and (5) leases for which there are no development plans of any kind known to the Geological Survey.

Estimated production from the first three lease categories was included in the 310 million tons per year "planned production" figure, with the understanding that the actual figure could vary substantially. Production from leases in the first category is the least likely to change from the planned amounts; the leases are likely to be exempt from unsuitability prohibitions and variation in amount of production, though allowed under the approved plans, is constrained by the resource conservation and sound mining method principles that governed initial approval of the mining sequence. Planned production from leases in the second category is less certain, of course, but still quite reliable. Significant mine plan modifications might increase as well as decrease production, although environmental assessments of major modifications may delay the planned production. The third lease category embraces planned production that will occur, but its timing is less certain. As a rule of thumb, lessees' plans were not systematically revised in calculating these quantities of planned production, even though the Department knows, and other users of this information should realize, that conforming the pending plans to the interim performance standards of the Office of Surface Mining Reclamation and Enforcement caused, as conforming the plans to the permanent program regulations will cause, some delay in reaching planned production levels and some possible loss of production to meet those environmental standards.

Potential production from leases in the fourth category became the additional "likely production" set out in Table 2-21 of the DES—some 57.3 millions tons per year in 1985. Potential production from leases in the fifth category was not included in 1985 production estimates at all.

The likely production information on leases, as well as all other information, will be publicly available and will be used by the regional coal teams who participate in the work on setting regional production goals and leasing targets.

B. UNSUITABILITY OF LANDS

1. How the criteria are applied.

The preferred unsuitability criteria under consideration for adoption as part of the federal lands program under the Surface Mining Control and Reclamation Act (SMCRA), 30 U.S.C. § 1201 et seq., and as part of the federal coal management program, were established by Secretarial decision on October 3 and November 2, 1978. (The 24 criteria are set out in section 3461.2 of the example regulations, Appendix A to the DES.) Those criteria finally adopted would be applied to all federal coal lands. SMCRA mandates the Secretary to review all federal lands for

unsuitability and it allows citizens to petition for and against designation of lands as unsuitable. Consequently, under SMCRA the Department must have procedures to apply unsuitability criteria both as part of a comprehensive federal lands review and as part of a petition process.

Section 522(b) of SMCRA requires the Secretary to review all federal lands, even though many coal areas are under the land managing jurisdiction of another agency, principally the Forest Service or the Corps of Engineers. By adopting the principle that the unsuitability criteria are best applied to federal lands in the land use planning conducted by each federal surface management agency, the Department has set a course for the federal lands review that would allow other surface management agencies to enter into cooperative agreements with the Department to carry out the federal lands review on lands they administer just as the Bureau of Land Management (BLM) will on land it administers. For any agency that does not have the resources to conduct such a review, the Secretary would remain obligated to complete this review.

Section 522(b) of SMCRA goes on to say that the Secretary will condition leasing on, or withdraw from leasing, lands that are found to be unsuitable for all or certain types of mining. For lands under the administration of other agencies, the conditions may be imposed by the Secretary or by the surface management agency when it consents to coal leasing on "its" lands. (Section 3 of the Federal Coal Leasing Amendments Act of 1976 (FCLAA), 30 U.S.C. § 201(a)(2)(B)(iii).) For lands already leased, the Secretary will of course consult with the surface management agency in approving a mine plan on the lease, so that step will be the focus for the application of conditions to implement the unsuitability criteria. While the discussion below focuses on the federal lands review process with respect to lands administered by BLM, it is applicable as well to lands administered by other federal agencies, whether the other agency is applying the Department's unsuitability criteria under a cooperative agreement or whether BLM is doing so for the other agency's lands.

2. The relationship between the federal lands review and the designation process.

With respect to lands administered by BLM, the Under Secretary on July 5, 1978, approved a delegation of authority that gives BLM the responsibility to administer the federal lands review through its land-use planning system and the Office of Surface Mining Reclamation and Enforcement (OSM) the responsibility to administer the statutory petition process. (Issues A3 and A2, Appendix B to the Federal Register Notice of December 8, 1978. 43 Fed. Reg. 57662, 57666.)

The federal lands review under section 522(b) of SMCRA, it must be emphasized, is not a program for the designation of lands as unsuitable for mining. Formal designation of federal lands as unsuitable, discussed in greater detail below, will occur only in response to a petition to designate under section 522(c) of SMCRA. The results of the federal lands review, rather than "designation" under 522(c) of SMCRA, will be: (a) land-use planning determinations, or trade-offs between competing resource values and land uses; and (b) unsuitability assessments or land-use planning recommendations to condition any leasing or mining, or to withdraw the lands from leasing. This conclusion is derived directly from the statutory definitions of the terms used to describe the petition and designation process under subsection 522(c), and the differences in the federal lands review under section 522(b).

A lessee's right to produce from a lease could be affected by both the federal lands review and the petition process. The SMCRA forbids the Department from approving a mining plan for lands that have been designated as unsuitable. In the absence of a petition, the Department's preferred alternative is not to approve a mining plan for an existing lease until after it has reviewed the leased lands for possible unsuitability. This is consistent with the President's direction in his Environmental Message to the Congress and an accompanying memorandum to the Secretary for the Department to take steps necessary to deal with environmentally unacceptable lease problems. (Vol. 13 Compilation of Presidential Documents 782,, 787 (1977).) Thus,, review of the unsuitability of leased lands could take place either through the land-use planning process under section 202 of the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. § 1712, which is the primary vehicle for the federal lands review, or another surface management agency's planning process, through the petition process, or through the mine plan approval process.

In some instances, the Department lacks legal authority to designate as unsuitable, or prevent the mining of lands in existing leases. The Department's preferred unsuitability criteria have their origin in a variety of legal mandates and the authority to regulate existing leases varies under these different authorities. In designing the preferred alternative, the Department has drawn legal prohibitions, agency policies and executive order directives into a single framework for the purpose of simpler administration of the federal lands review. For example, criteria which stem from section 522(a) of SMCRA, the direct source of the concept of "unsuitability criteria," cannot be applied to lands on which an operator is in production on August 4, 1977, or to operations for which "substantial financial and legal commitments" had been made by January 4, 1977. Standards which derive from section 522(e) of SMCRA cannot divest "valid existing rights." Table IV, which should be thought of as an explanation and supplement to Table 3-1 in the DES, lists each proposed criterion and its statutory source. It also indicates whether

TABLE IV

PROPOSED UNSUITABILITY STANDARDS:
THEIR SOURCES AHD LIMITATIONS

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
1-1. Lands in federal land preservation systems (National Parks, Wildlife Refuges and Trails	a. 522(e)-SMCRA;	a. mandatory	a. valid existing rights; surface coal mining operations existing on 8-3-77	
	b. 16-FCLAA	b. mandatory	b. none	
1-2. Buffer zones around such land	522(a)(3)-SMCRA Clean Air Act	discretionary	522(a)(6)-SMCRA 2/	
1-3. Lands in Custer National Forest [3461.2(a)]	522(e)-SMCRA	mandatory	valid existing rights; existing surface coal mining operations	operations that involve no surface coal mining operations (522(e)(2)(B) proviso-SMCRA)

1/ Statutory sections are cited if clear. SMCRA means the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. § 1201 et seq.; FCLAA means the Federal Coal Leasing Amendments Act of 1976; FLPMA means the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701, et seq.

Section 2 of the Mineral Leasing Act, as amended, 30 U.S.C. § 201, contains the Secretary's ultimate discretion to lease or not to lease in the public interest. It applies to all the criteria. Similarly, sections 201 and 202 of FLPMA, the Secretary's resource inventory and land use planning authorities, apply to all criteria on all lands administered by the Bureau of Land Management. These sections are cited only when they are relied on as authority for the criterion.

2/ In every case, section 522(a)(6) exempts: (a) operations approved under SMCRA; (b) surface coal mining operations existing on August 3, 1977; and (c) operations to which substantial legal and financial commitments were made prior to January 4, 1977.

3/ The general authority for the exception is found in the coverage or limitations on the coverage of the statutory policies and protections.

TABLE IV - page 2

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
2. Lands in federal leases, permits or rights-of-way for other purposes [3461.2(b)]	a. 715-SMCRA; b. 522(e)(4)-SMCRA	a. mandatory b. mandatory	b. valid existing rights; surface coal mining operations existing on 8-3-77	discretion when section 715 satisfied by consent or otherwise
3. Lands within certain distances of cemetaries, public buildings, public roads [3461.2(c)]	a. 522(e)(4) and (5)-SMCRA	a. mandatory	a. valid existing rights; surface coal mining operations existing on 8-3-77	522(e)(4) and (5)-SMCRA
	b. 522(a)(3)(B)	b. discretionary	b. 522(a)(6)-SMCRA 2/	
4. Lands in wilderness study areas [3461.2(d)]	a. 603(c)-FLPMA;	a. mandatory in most cases	a. operations in manner and degree of existing operations; valid existing rights	a. if nonimpairment of wilderness suitability --603(c)-FLPMA;
	b. 522(a)(3)(B)-SMCRA;	b. discretionary	b. 522(a)(6)-SMCRA 2/	
	c. National Forest Management Act; d. Wilderness Act	c. discretionary		c. Wilderness Act 3/
5. Class I or II scenic lands [3461.2(e)]	a. 522(a)(3)(B)-SMCRA; b. 201-202-FLPMA	discretionary	a. 522(a)(6)-SMCRA 2/ b. valid existing rights	discretion
6. Lands used for scientific study (crops, resources, technology) [3461.2(f)]	a. 522(a)(3)(C)-SMCRA; b. 715-SMCRA	a. discretionary b. mandatory	a. 522(a)(6)-SMCRA 2/	discretion when section 715 satisfied by consent or otherwise

TABLE IV - page 3

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
7-1. Lands containing listed or eligible National Register sites	a. 522(e)(3)-SMCRA;	mandatory	a. valid existing rights; surface mining operations existing on 8-3-77	National Historic Preservation Act 3/
	b. National Historic Preservation Act	discretionary		
7-2. Buffer zones for such lands [3461.2(g)]	522(a)(3)(B)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	
8. Lands in national natural landmarks [3461.2(h)]	522(a)(3)(B)-SMCRA; Antiquities Act	discretionary	522(a)(6)-SMCRA 2/	discretion
9. Lands in designated critical habitat for or documented as habitat for federal threatened or endangered species [3461.2(i)]	Endangered Species Act	mandatory	none	Endangered Species Act 3/
10. Lands in designated critical habitat for state threatened or endangered species [3461.2(j)]	201, 202 and 302(b)-FLPMA	discretionary	valid existing rights	discretion
11. Lands containing bald or golden eagle nest, and buffer zone [3461.2(k)]	a. Eagle Protection Act;	a. mandatory	none	Eagle Protection Act 3/
	b. Endangered Species Act	b. mandatory		Endangered Species Act 3/

TABLE IV - page 4

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
12. Lands containing bald or golden eagle migration or wintering roost, and buffer zone [3461.2(l)]	Eagle Protection Act; Endangered Species Act	mandatory	none	Eagle Protection Act 3/ Endangered Species Act 3/
13. Lands with falcon cliff nesting site, and buffer zone including prey habitat [3461.2(m)]	a. Migratory Bird Treaty Act; b. 201, 202-FLPMA Endangered Species Act	mandatory mandatory	none	Migratory Bird Treaty Act 3/ Endangered Species Act 3/
14. Lands that are high priority habitat for migratory birds of high federal interest [3461.2(n)]	a. Migratory Bird Treaty Act; b. Fish and Wildlife Coordination Act	a. mandatory b. discretionary	none	a. Migratory Bird Treaty Act 3/ b. discretion
15. Lands that are habitat for high interest resident wildlife in state [3461.2(o)]	a. Fish and Wildlife Coordination Act; b. 201, 302(b)-FLPMA	both discretionary	a. none b. valid existing rights	discretion

TABLE IV - page 5

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
16. Lands that are inland wetlands [3461.2(p)]	a. 522(a)(3)(C)-SMCRA; b. Fish and Wildlife Coordination Act; c. E.O. 11990 (May 1977), National Environmental Policy Act; d. Federal Water Pollution Control Act	all discretionary	a. 522(a)(6)-SMCRA 2/ b. none c. none d. Environmental Protection Agency or Corps of Engineers permitted activities	discretion

17. Lands in 100-year floodplains [3461.2(q)]	a. 522(a)(3)(C)-SMCRA;
	b. 522(a)(3)(D)-SMCRA;
	c. E.O. 11988 (May 1977)
		all discretionary	522(a)(6)-SMCRA 2/	discretion

18. Lands used as municipal watersheds [3461.2(r)]	a. 522(a)(3)(C)-SMCRA; b. Safe Drinking Water Act; c. Federal Water Pollution Control Act	discretionary	a. 522(a)(6)-SMCRA 2/ c. Environmental Protection Agency or Corps of Engineers permitted activities	discretion

TABLE IV - page 6

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
19. Lands containing National Resource Waters, and buffer zones [3461.2(s)]	a. Federal Water Pollution Control Act; b. 522(a)(3)(C)-SMCRA	discretionary	a. Environmental Protection Agency or Corps of Engineers permitted activities b. 522(a)(6)-SMCRA 2/	discretion
20. Lands containing prime farm land soils [3461.2(t)]	522(a)(3)(C)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	515(b)(7)-SMCRA; discretion
21. Lands in alluvial valley floors, where mining would interrupt or preclude farming, or materially damage water systems [3461.2(u)]	a. 510(b)(5)-SMCRA; b. 522(a)(3)(C)-SMCRA	mandatory	a. operations producing or permitted in year before 8-3-77 b. limited to a. above	510(b)(5)-SMCRA
22. Lands not reclaimable in conformity with SMCRA [3461.2(v)]	510(b)(2)-SMCRA	mandatory	none	none
23. Lands subject to a criterion suggested by a state and adopted by rulemaking [3461.2(w)]	522(a)(3)(A)-SMCRA; 522(a)(5)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	discretion

CRITERION (Proposed Rule Section)	STATUTORY SOURCE 1/	NATURE OF CRITERION	EXEMPTIONS	DERIVATION OF EXCEPTIONS
24. Lands needed as buffer to lands designated unsuitable by a state [3461.2(x)]	522(a)(3)(A)-SMCRA; 522(a)(5)-SMCRA	discretionary	522(a)(6)-SMCRA 2/	discretion

it is mandatory or discretionary, and what exemptions it carries, and thus what its probable effect on existing leases will be. These are the criteria adopted as the preferred alternative last fall after the Department field tested the initial draft criteria in the summer of 1978 and modified the test criteria in response to the results of the field testing.

It must also be emphasized that assessment of lands as subject to an unsuitability criterion does not mean (exemptions aside) that no mining may occur there. The federal lands review is to assess whether the lands are "unsuitable for all or certain types of surface coal mining operations." (Section 522(b) of SMCRA (emphasis added).) While the term "surface coal mining operations" does include "surface operations and surface impacts incident to an underground coal mine" (section 701(28) of SMCRA), it is clear that some unsuitability assessments will result in recommendations only against leasing for, or prohibitions against, mining of certain types. These considerations will be an integral part of the application of the unsuitability criteria (either in land-use planning or in the mine plan approval process), or in the designation of lands in response to a petition.

3. The federal lands review.

As stated above, the review of federal lands administered by BLM will occur either as a land-use planning function or in the process of mine plan approval. 1/ The responsible official of the Federal land management agency would describe in the land use plan the results of the application of each of the unsuitability criteria to the medium and high potential coal lands in the planning area. He would state each instance in which a criterion is found to be applicable and show the area which is excluded from further coal development consideration, or, should he determine that the conditions for an exception exist, describe the area to which the exception applies and discuss in detail the reasons why the exception is made and what type of stipulations will be required in the lease or mining permit to assure compliance with the exception.

In applying the criteria and exceptions, the responsible official would first publish a composite map showing full application of all criteria prior to consideration of any of the exceptions. The map would be part of the formal documentation to be made available to the public. Only after the map has been prepared and made public would the exceptions be applied; however the responsible official would consider using an exception only when a small area (1) has applicable to it a criterion, (2) is in a larger area to which no criteria otherwise apply, and (3) would likely preclude the designating of any lease tracts within the larger area. This procedure deters aggressive application of the exceptions and places a distinct burden of proof on the responsible official to carefully and forcefully document any application of exceptions which he or she would make.

1/ It could also occur during other activities such as lease readjustment depending on the timing of those activities.

The responsible official would make his assessment on the best available data that can be obtained given the time and resources available to prepare the land-use plan. The description in the plan would explain whether additional data would be likely to affect significantly the conclusions reached about unsuitability. The plan would also disclose when in activity planning, lease sale, or post-lease activities the necessary data would be obtained. When the data are finally acquired, the responsible official would then be required to make public the resulting assessment concerning unsuitability and the reasons therefor and provide opportunity for public comment before that assessment is adopted. Any changes which either result from a petition process for designating land unsuitable or or are warranted by additional data acquired in any activity planning or mine plan review process would be made without formally revising the plan.

Lands with coal that would be mined by underground mining methods would not be considered unsuitable for coal mining where the mining would result in no hydrologic or surface effects. Where underground mining would produce hydrologic or surface effects on Federal lands to which an unsuitability criterion applies, those lands would be considered unsuitable unless the conditions exist to permit an exception.

The unsuitability review process is set out in two instruction memoranda from the Director, BLM. Instruction Memorandum (I.M.) 79-76 (November 8, 1978), published at 43 Fed. Reg. 57664 (December 8, 1978), instructs the coal state BLM offices how to apply the criteria to lands in completed, approved management framework plans (MFPs). Because the criteria and exceptions selected by the Under Secretary for the preferred program are changed significantly from the criteria and exceptions originally field tested by the task force, the Department determined that they should be field tested anew as part of their application in selected BLM planning areas before any final decision on them is made by the Secretary. Furthermore, the procedures for these field tests were designed to ensure that the criteria and exceptions would receive attention not only from the land management agencies' planners, but also from interested user groups and the public. The field tests are being conducted in Alabama and in 20 coal areas in 10 planning units in Colorado, Montana, Utah, and Wyoming, and the results will be made available to the public in the form of supplements to existing land-use plans. The supplements will be published in May of this year and will be fully considered by the Secretary prior to making any final decision on a Federal coal management program. Any changes in the preferred criteria and exceptions adopted by the Secretary would be subsequently incorporated in the supplements which will have been published before the Secretary's decision.

Subsequently, I.M. 79-139 (December 15, 1978), published at 44 Fed. Reg. 2201 (January 10, 1979), instructed the coal state BLM offices how to incorporate application of unsuitability criteria into ongoing and future planning processes. While I.M. 79-76 dealt with formulating a

discrete MFP "supplement" on unsuitability, I.M. 79-139 describes which steps in unsuitability assessment are to be taken at which steps in the existing BLM planning process: during inventory, during mapping, at public participation points, and during multiple-use trade-off determinations.

Both completed "supplements" and ongoing planning products will be subject to revision and supplementation to accommodate any changes in the unsuitability criteria, both in the coal program decision and in the future. The ongoing tests have been carefully structured to simplify their revision or supplementation if standards change. The review may be done for leased as well as unleased lands.

To repeat, the assessment of unsuitable areas in the land-use plan is not the formal designation that may result from a petition under section 522(c) of SMCRA. In addition, the assessment of unsuitable lands in the land-use planning process will have different consequences for unleased and leased lands. For unleased lands, as described above, the planners will then determine whether or not to exercise any applicable exception to a criterion. The Department will not further consider for leasing those unleased lands with identified problems, and on which it chooses not to assert an identified exception.

The assessment that leased lands are unsuitable, however, means that the Department applies all exceptions to the criteria in question. Again, this may happen either in the course of land-use planning or in response to submission of a mine plan on the lease. If any exception applies, the Department will allow mining subject to any conditions or mitigating measures inherent in the exception. If no exception applies, however, the Department will proceed to the final "screen" and determine whether the lease is exempt from the application of the criterion in question because, for instance, the operator has made substantial financial and legal commitments to the lease. If the lease is exempt, the assessment that the lands are unsuitable will still not prevent mining. Only if the leased lands are not exempt, that is, not "grandfathered" from adverse application of the criteria as valid existing rights or as an operation to which "substantial financial and legal commitments were made," will the Department then continue to prohibit mining, and the Department may formally designate the lands as unsuitable in response to a petition under section 522(c) of SMCRA.

4. Mine plan approval.

If land-use planning has not been completed on a leased tract at the time a mine plan is submitted for approval, the unsuitability criteria will be applied to the lands as part of the approval process. The environmental analysis or impact statement on mine plan approval will document the application of the criteria and their exceptions to the leased lands, whether the criteria were applied during prior land-use planning or as part of the mine plan review.

If a criterion applies, the Department would evaluate whether, under an exception to the criterion, the plan could be changed to eliminate the harmful effects on the value which the criterion is designed to protect. If no change could be made and some or all of the proposed operation could not occur consistent with the criterion, the Department would decide whether the operator was exempt from application of the criterion. If he is not, the Department will condition or prohibit operations on some or all of the leased lands when it acts on the mine plan.

The mine plan approval process, whether under 30 CFR Part 211 with Geological Survey as the lead agency, or under the SMCRA permanent program regulations with OSM as the lead agency, will contain public participation procedures (especially if an environmental impact statement is completed on the plan) comparable to those applicable to land-use planning.

5. Petitions to designate federal lands.

Apart from application of the unsuitability criteria in land-use planning and in response to a proposed mine plan, the designation process may be initiated by a petition to designate lands as unsuitable under section 522(c) of SMCRA. Petitions will be filed with OSM under the division of responsibilities established on July 5 (Issue A2, Appendix B to the Federal Register notice of December 8, 1978). Section 522(c) requires the petitioner to be adversely affected by potential mining of the lands in question, and requires each petition to "contain allegations of facts with supporting evidence" to establish the truth of the allegations. Because of these threshold requirements, it is assumed that the public lands will not be blanketed by petitions. On those petitions that do pass the threshold requirements, designation as unsuitable, rejection of the petition, or termination of a prior designation must occur within one year. The year provides the time in which the BLM (or other surface management agency) will substantively review the petition, and if necessary and possible examine the tract, and in which a public hearing on the petition will be held and a written decision rendered.

The petition process is not limited in application, and appears to apply to leased as well as unleased federal coal lands, subject of course to the exemptions set out in SMCRA: that the application of criteria derived from section 522(e) is subject to valid existing rights; and that the application of criteria derived from section 522(a) does not apply to operations in existence on August 4, 1977, operations permitted under SMCRA, and operations to which substantial financial and legal commitments were made prior to January 4, 1977. Thus the unsuitability of leased lands may be assessed under this process without any mine plan pending, or without any land-use planning process occurring. Conversely, the lessee may petition to have any designation of the leased lands as unsuitable for coal mining terminated under the same petition process and time limits. The surface management agency's response to OSM's referral to

it of a petition will of course be easier and quicker for lands on which land-use planning has occurred, since the inventory of the lands and analysis of the criteria on those lands will already have occurred.

While the criteria applied in the federal lands review and the petition process are the same, it is important to note that OSM, not the surface management agency, controls the outcome of the petition process. It may be that certain lands which are not found to be unsuitable in land-use planning may be designated unsuitable upon petition, and conversely, lands deemed unsuitable by the surface management agency may not be designated unsuitable upon petition. This is possible because the unsuitability criteria themselves, and their exceptions, are, in origin and function, designed to ensure environmental protection and establish mitigation of adverse impacts, while the formal designation process requires consideration of coal demand and the socio-economic impacts in carrying out the environmental purposes served by the criteria. Section 522(d) of SMCRA requires OSM, prior to designating federal land unsuitable, to prepare a "detailed statement on (i) the potential coal resources of the area; (ii) the demand for coal resources, and (iii) the impact of such designation on the environment, the economy, and the supply of coal." 30 U.S.C. § 1272(d). In order to assure the greatest consistency between OSM's unsuitability designations and BLM's land-use planning unsuitability assessments, the BLM's draft coal management regulations require that the same "detailed statement" be made by BLM to document its unsuitability assessments when it adopts a land-use plan. (Draft 43 CFR 3461.4-3.)

6. Exchange of unsuitable lands.

The Department has some limited authority to issue new coal leases, coal lease modifications, leases for other minerals, or lease bidding rights in exchange for the relinquishment of outstanding coal leases or preference right lease applications. This authority can be exercised in some cases where the Department finds that it would be in the public interest to shift the impacts of mining operations from the lands under lease to other lands, or to relieve lessees of lease obligations on leases wholly or partially unmineable because of unsuitability assessments or designations. What follows is a description of the Secretary's existing exchange authority, a discussion of the substantial limitations on this authority,, and a discussion of the issues involved in the Department's present policy toward exchanges, which further limits the number and class of cases in which the Department is likely to consummate an exchange.

a. Existing authority. Congress has authorized the outright exchange of certain federal coal leases within alluvial valley floors for leases outside alluvial valley floors (section 510(b)(5) of SMCRA, 30 U.S.C. § 1260(b)(5)). Although this authority can be exercised whether or not the lessee has had a surface mining permit rejected for the leased lands

(Memorandum of November 2, 1978 from Associate Solicitor, Energy and Resources, to Director, Office of Coal Leasing, Planning and Coordination (OCLPC) "Legal Issues in the Draft Coal Regulations"), it has potentially narrow application. The only leases on which such lease-for-lease exchanges can be based are those on which the operator neither was producing coal in 1976-77, nor had a permit to do so from the state regulatory authority, but on which he had made substantial financial and legal commitments to an operation prior to January 1, 1977. The size of this class of operators is as yet undetermined.

Outside of alluvial valley floor lease exchanges, the Secretary has the authority, under regulations promulgated over a year ago, to accept the relinquishment of a federal coal lease and in exchange: (1) to issue a federal lease for sodium, potassium or phosphate; (2) to modify another existing coal lease to include additional acreage; (3) to issue bidding rights for the value of the relinquished lease, which could be redeemed in payment of all or any portion of a bonus bid on a competitive coal lease sale; or (4) any combination of the above. (43 CFR Subpart 3526, December 23, 1977, 42 Fed. Reg. 64346, example regulations 43 CFR Subpart 3435 (DES Appendix A-22-23).) It is also possible under the existing rules for a sodium or other non-coal lessee to exchange his lease or preference right lease application for coal lease modifications or bidding rights, as well as another non-coal lease.

Prior to the enactment of the Federal Coal Leasing Amendments Act of 1976 (FCLAA) on August 4, 1976, the Secretary had the authority to issue exchange coal leases in the same manner as he can continue to do with sodium, potassium and phosphate leases. The Congress provided in the FCLAA, however, that coal leases could only be issued by competitive bidding, and removed from the coal leasing provision the general authority to issue leases by "such other methods as [the Secretary] may by general regulations adopt" that remains in the sodium, potassium and phosphate provisions of the Mineral Leasing Act, and which was used to promulgate the exchange lease regulations for other minerals. The Department requested general coal exchange leasing authority in the 95th Congress, but failed to receive it. The Senate passed such provisions, including a provision that adopted the Department's policy toward coal exchanges discussed below, but the House enacted authority to consider only a few named coal lease exchanges. The House version prevailed. (S. 3189, the Act of October 30, 1978, 92 Stat. 2073. See 124 Congressional Record S 18754, S 18755 (October 13, 1978), remarks of Senator Jackson.)

b. Limitations on existing authority. There are difficulties with effecting lease exchanges under existing law that may eventually motivate the Department to return to the Congress with a request for general coal lease exchange authority. Since the alluvial valley floors of the West have not been mapped, it is not certain how many such exchange lease cases there may be. The Department has read the section 510(b)(5) proviso

to authorize lease exchanges even though the entire lease is not in an alluvial valley floor (Memorandum of November 2, 1978, cited above, "Legal Issues on the Draft Coal Regulations"), but the substantial financial and legal commitments threshold may still restrict the number of operators who will ever be eligible for an exchange lease under this authority.

Unless and until competitive coal leasing is resumed on a regular basis, there is little incentive for an operator to seek bidding rights. Even should coal leasing be needed, it might not occur in regions or locations, or in types of coal, that the holder of existing leases on unsuitable or potentially unsuitable lands would be interested in seeking through bidding rights. Exchange leases of other minerals are of interest, of course, only to companies which mine minerals other than coal.

Coal lease modifications are attractive only if operations on the original lease acreage are not likely to be limited or prohibited by application of the unsuitability criteria. Thus they are likely to be considered by lessees who have other federal leases that either are operating, and are thus grandfathered from the application of most of the unsuitability requirements, or are not operating but are on lands likely not to be found unsuitable. 2/ No modification or modifications to a coal lease can add more than 160 acres, or the original lease acreage, whichever is less, to the lease. (90 Stat. 1090-91, 30 U.S.C. § 203.) The acreage a lessee could acquire by modification is thus limited by the number of existing leases he holds that could be modified. The coal in a 160-acre modification might well not be equal to the value of an unsuitable lease that would be relinquished in such an exchange.

This discussion demonstrates that there is some authority to deal with some cases of existing coal leases on lands assessed or designated to be unsuitable for coal mining operations, or on which land-use planning decisions indicate that mining operations should not occur. At the same time, this discussion demonstrates that: each specific exchange will be a complicated, detailed matter that can only be proposed after case-by-case examination of a land-use plan, mine plan approval application, or

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2/ The Congress did amend section 3 of the Mineral Leasing Act, 30 U.S.C. § 203, in the 95th Congress, to change the language of section 13(b) of the FCLAA, which required that the original coal lease that had acreage added by modification had to conform to all the provisions of the FCLAA, including the higher minimum royalties and the statutory diligence requirements. Section 3 of the Act of October 30, 1978, made the imposition of revised diligence terms on the original lease discretionary with the Secretary, and prohibited the increase of the royalty rate on the original lease until its normal twenty-year readjustment. Pub. L. No. 95-554, section 3, 92 Stat. 2074.

a petition to designate leased lands unsuitable; and 2) the Department may require additional general coal lease exchange authority before exchanges are seen as a viable management tool.

c. Policy issues in exchanges. Neither section 510(b)(5) of SMCRA, the alluvial valley floors provision, nor the Department's exchange leasing regulations require the Secretary to consummate or even to consider an exchange in any given case. Thus, initiation of an exchange remains within the informed discretion of the Secretary. The existing exchange regulations do not contain any specific standards for the exercise of this discretion; rather, they prescribe procedures designed to ensure a soundly-based conclusion that an exchange, in a given case, is in the public interest. (See 43 CFR 3526.1(b) and (c).) The following discussion is designed to illuminate classes of cases in which exchanges will and will not be likely to be considered.

Leases issued prior to August 4, 1976, on which the lessee does not diligently initiate production in compliance with the applicable regulations and lease terms will be subject to cancellation. (These requirements are discussed in part C below.) Cancellation of coal leases is accomplished by initiation of a suit to cancel the lease by the United States in the federal district court for the district in which the leased lands are located. (30 U.S.C. § 188(a).) Such action will be appropriate in any case of a lease maintained in violation of its terms or applicable regulations, whether or not the lands have been designated or assessed as unsuitable for all or any type of coal mining operations. For instance, some leases require the lessee to submit a mine plan within three years after readjustment. If a lease was readjusted in late 1976 and a mine plan is now due for the lease in late 1979, the Department probably would not consider an exchange for the tract unless a mine plan was filed in a timely fashion or the lessee otherwise made reasonable efforts to begin production. Even if the lands in such a lease are eminently likely to be designated or assessed to be unsuitable, the Department will not normally initiate an exchange. Rather, the Department will wait until late 1979, and if no mine plan is timely submitted, will seek cancellation of the lease for violation of its terms.

In contrast, there will be cases where a potential lease operation will be exempt (as discussed above) from the application of the Department's unsuitability criteria, even though the criteria would have applied to prevent the leasing and development of the tract if the lands were unleased. In these cases the Secretary is quite likely to initiate an exchange, since the unsuitability criterion applicable to the lands is an expression of the public interest in how public lands should and should not be managed and developed. If the lessee were willing to agree to an exchange, the Department would be able to shift the impacts of coal mining from a tract on which the Department's formal position

was that mining should not occur to acceptable lands elsewhere. If the lessee were unwilling to enter into an exchange, he could mine his existing lease.

Between these two extremes lie the more difficult cases. In the case of a lease on which both: (1) the lessee has diligently engaged in development activities, especially by the submission of a mine plan for approval, is in no other way in violation of the lease, and is not exempt from the unsuitability criteria; and (2) the Secretary designates or assesses all or significant portions of the tract as unsuitable for the contemplated type of coal mining operation, the Secretary could initiate exchange proceedings. Is it in the public interest to exchange a lease in a case where the Department could lawfully prevent mining of part of the lease without compensating the lessee? A lessee who (1) intends to develop his lease and (2) is not in violation of any lease diligence requirement will not be able to develop parts of his lease if he cannot meet the requirements of SMCRA. The Congress, in establishing the unsuitability concept, did not authorize the Department to "take" or condemn lease rights. Unsuitability standards, however, like Clean Air Act or Water Pollution Control Act standards or tax or health laws, can limit or control the manner in which the lease can be developed, or whether it can be developed at all. The lessee would eventually be faced with the fact that because a mine plan cannot be approved on the lease, he will violate the diligent development requirement of his lease. Just as in the case of operations that cannot be permitted under the Clean Air Act or other laws, the lessee would be unable to operate and eventually the lease would be subject to cancellation.

In letters to both of the Congressional Committees, the Department requested that the Congress make it clear that the generic exchange authority contained in the bill could be applied only to leases on which the unacceptable impacts of mining could not be prevented or adequately mitigated under the authority of SMCRA or other federal law. Letter of June 27, 1978, from Deputy Assistant Secretary Wicks to Senator Jackson; letter of July 24, 1978, from Assistant Secretary Martin to Congressman Udall. Under this policy an exchange could be consummated either because the operation was exempt from the application of unsuitability criteria or other SMCRA authority, or because the unacceptable adverse impacts would be socio-economic in nature or affect environmental values not incorporated into the unsuitability criteria, and would not be subject to direct regulation under SMCRA or other environmental laws. The Senate incorporated this amendment as subsection (i) of section 1 of S. 3189. S. Rep. No. 95-1169, at 6, 10 (August 1978). These letters stand as statements of Departmental policy in these cases.

The passage of S. 3189 in a form (P.L. 95-554, 92 Stat. 2073) that does not speak to generic exchange authority leaves the Department with its prior discretionary authority intact. If the Department altered the policy expressed in the June 27 and July 24 letters, it would then have

the difficult task of establishing policies, either by regulation or by case-by-case action on such leases, to govern the cases of lessees who cannot mine because they are not exempt or excepted from the unsuitability criteria applicable to their leases. Any policy must answer these questions about exchanges of this type. 3/ What is the value of the relinquished lease which cannot be mined? If the value of a lease that the Department can lawfully prevent from being mined is zero, is the Department giving away something in exchange for nothing? Is it appropriate to exercise discretion to avoid the risk of an eventual determination that an unsuitability criterion cannot constitutionally be applied to a lease pre-dating its establishment? While we may be able to establish objective criteria for determining which cases are proper for exchanges and which are not, we may also find that this set of problems may eventually motivate the Department to return to the Congress for generic, clarified exchange authority.

3/ The Congress clearly authorized the Department to consummate exchanges in cases where private coal could not be mined because of the alluvial valley floor mining prohibition in SMCRA. In fact, the Congress directed the Secretary to establish a program for the exchange of title to federal coal lands in exchange for the conveyance to the United States of private coal subject to the alluvial valley floors mining prohibition (section 510(b)(5) proviso of SMCRA, 30 U.S.C. § 1260(b)(5)). At the same time the Congress did not speak to the question whether the authority should be exercised only when necessary to avoid a taking, or whether it should be exercised to avoid ever having to establish the existence or nonexistence of a taking in an alluvial valley floor mining prohibition. Thus the Congress never spoke to questions related to the exchange value of a tract on which the Secretary could lawfully prohibit mining. While the Congress did not direct the Secretary to establish a program for the exchange of federal leases subject to the alluvial valley floor mining prohibition, its intention to give the Secretary as much authority with lease exchanges as it gave him with private land exchanges seems clear. The exchange leasing regulations for coal lease modifications and bidding rights discussed above, however, are derived from discretionary authority granted the Secretary by the Mineral Leasing Act, and there is thus no Congressional direction to follow in this regard. The generic exchange authority passed by the Senate but deleted from the enacted version of S. 3189, the Act of October 30, 1978, would have superseded the Department's lease bidding rights exchange regulations, but left the lease modification and inter-mineral exchange regulations intact. S. Rep. No. 95-1169, on S. 3189 (at 6).

7. Potential legislation for purchase or condemnation of leases.

The exchange authorities set out above do not, however, include the authority to compel an exchange. The procedure is mutually voluntary, and the exchange will be consummated only if both the United States and the lessee are satisfied by its terms. In cases where the lessee is unwilling to consider an exchange proffered by the Secretary, or the Secretary and the lessee are unable to agree on the location or value of exchange tracts or rights, an operation which is exempt from the applicable unsuitability criterion will go forward unless the Secretary suspends the lease in order to seek legislation authorizing him to prevent the operation.

The Secretary has no generic condemnation authority over private interests in public lands and resources. Congress in 1976 gave the Secretary the authority to condemn rights-of-way "only if necessary to secure access to public lands." (Section 205(a) of FLPMA, 43 U.S.C. § 1715(a).) In 1978, Congress gave the Secretary the authority to terminate (in effect cancel) Outer Continental Shelf oil and gas leases. (Section 204 of the Outer Continental Shelf Lands Act Amendments of September 18, 1978, 43 U.S.C. § 1334(a)(2).) There is no comparable authority, however, for "onshore" federal mineral leases. This authority for federal coal leases was part of the same provision dealing with the exchange of federal coal leases that the Congress failed to enact as part of S. 3189, the Act of October 30, 1978, Pub. L. No. 95-554. The processes of approving mine plans, and assessing and designating leased lands unsuitable for coal mining, or rejecting petitions for designation, will be followed closely in the Department to determine whether coal lease condemnation authority, or the authority to compel the exchange of lease rights, should eventually be sought from the Congress in order to implement successfully the purposes of the unsuitability concept as a land-use planning and environmental protection mechanism.

C. DILIGENCE REQUIREMENTS ON LEASES ISSUED PRIOR TO AUGUST 4, 1976.

The FCLAA established diligent development and continued operation requirements for all federal coal leases issued after the passage of the FCLAA on August 4, 1976. Many of these requirements were derived, if not adopted, from the diligent development and continued operation requirements established by the Department for all existing leases by regulations issued in May 1976. The FCLAA requirements are applicable, however, only to the some 9 leases issued since August 4, 1976. All of the 525 or so existing leases that were issued prior to August 4, 1976, are subject to the diligence requirements established on May 28, 1976. (41 Fed. Reg. 21780.) The regulations were revised on December 29, 1976, to reflect the co-existing requirements of the May regulations for pre-FCLAA leases and the new requirements governing post-FCLAA leases. (41 Fed.

Reg. 56644.) The May regulations establish two discrete sets of requirements, diligent development standards and continued operation standards, which we will refer to below collectively as "diligence requirements." Because the administration of the May regulations will govern the development of the 500 plus leases to which they apply, their provisions and the issues in their administration are of significance to the Department. Following a discussion of the issues in their administration, the provisions of the December 1976 regulations to implement the FCLAA are discussed.

1. May 1976 requirements.

First, the regulations state that, for the purposes of the regulations, each lease is automatically a "logical mining unit" (LMU). (43 CFR 3500.0-5(d)(1977).) Thus, diligent development and continued operation requirements apply, strictly speaking, to an LMU, rather than a lease. The second requirement of the May 1976 regulations is the "diligent development" requirement that production of coal in commercial quantities from each LMU must begin within 10 years of the effective date of the rules. (43 CFR 3500.0-5(f)(2) (1977).) The regulation defines "commercial quantities" for this purpose as one-fortieth or 2 1/2% of the LMU reserves. Third, the May 1976 regulations also imposed the "continued operation" requirement that after commercial production begins, one percent or more of the lease reserves be mined annually. The annual percentage is to be calculated on a three-year basis, to allow for fluctuations in production levels that may be expected to occur. (43 CFR 3500.0-5(g) (1977).)

Fourth, the May regulations authorize the Secretary, at the request of a lessee, to combine the lease with other federal leases or private lands to form a larger LMU. This combination of leases or lands allows production on other federal or nonfederal lands that are part of the lease LMU to count toward compliance with these regulatory requirements governing federal leases. The ability to credit production on some lands against production obligations of other lands promotes more sensible development from both economics and resource conservation perspectives. The example regulations in the DES carry these diligence regulations into the new 43 CFR Group 3400 verbatim. In the absence of rulemaking by the Department of Energy (DOE) these rules would be repromulgated as they stand in June. DOE has transmitted draft regulations that would establish new milestone requirements, like the three-year mine plan submission requirement of the FCLAA, on existing leases, but it has drafted no changes in the requirements set out above.

2. Extensions and modifications of requirements.

The Secretary can, in the course of administering existing leases, modify these requirements for any specific LMU as follows. First, the ten-year period for achieving diligent development may be extended (upon application

by the lessee) for the length of time development is significantly impaired by: strikes or acts of God; administrative delay not caused by the lessee (such as completion of an environmental impact statement); or extraordinary and unforeseeable circumstances (coal price or market condition fluctuations do not qualify). (43 CFR 3520.2-5(c) (1977).)

Second, the Secretary has the discretion under the existing regulations to extend the ten-year period up to five more years upon application by the lessee if the extension period is necessary: to complete work on an advanced technology process (such as gasification or liquefaction); to develop a very large mine (over 2 million tons per year underground or 5 million tons per year surface mining at the initiation of production); or the firm commitment of the LMU coal to a use or sale after the ten-year period.

Third, it appears that the Congress in enacting section 6 of the FCLAA (30 U.S.C. § 207, as amended), did not repeal the Secretary's authority to suspend federal coal leases and all operations and obligations totally under section 39 of the Mineral Leasing Act (30 U.S.C. § 209). 4/ This type of section 39 suspension, authorized only in the interest of conservation of the natural resources, suspends the lease in its entirety, not just the running of diligence obligations. (43 CFR 3503.3-2(e).) Thus, if the Secretary were to order or consent to a suspension of this type under section 39 during the fifth year of the ten-year period in which diligent development must be achieved, and the suspension lasted two full years, no rental or advance minimum royalty obligation would be owed on the lease, and the lease would, upon termination of the suspension, still be in the fifth year of the running of its diligence requirements.

The statute is silent on how the Secretary is to exercise the discretion granted by section 39 to suspend leases, and the Department has never delimited that discretion by regulation. E.g., 43 CFR 3503.3-2(e)(1977). It is clear, however, that it is a broad authority, and is applicable to the situations described in the preceding paragraphs on extending or modifying the diligence requirements, as well as situations not embraced by those other authorities, such as administrative or judicial delay in taking action on timely development plans.

At the same time the Congress left almost wholly intact the Secretary's other type of suspension authority under section 39 of the Mineral Leasing Act—the authority to "waive, suspend, or reduce the rental, or minimum

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4/ Section 6 of the FCLAA, 30 U.S.C. § 207 (1976), and the provisions it amended, 30 U.S.C. § 207 (1970), are the sources of both the diligence requirements and of the extension and modification authorities discussed above. Section 39, however, is not limited in application to coal leases, and was only slightly amended by the FCLAA.

royalty, or reduce the royalty on an entire leasehold . . . ." 30 U.S.C. § 209. This authority may be exercised whenever it is necessary "to promote development, or whenever . . . the leases cannot be successfully operated under [their] terms." This authority is now limited solely by the further provision that the Secretary cannot "waive, suspend, or reduce advance royalties." Section 14 of the FCLAA, 30 U.S.C. § 209 (emphasis added). Advance royalties are royalties paid in lieu of continued operation under the lease.

Finally, the Secretary has the authority to "extend" or "modify" the diligence requirements by waiving violations of the lease terms and governing regulations. Such a waiver may occur formally, in writing, under the authority set out above to waive payment obligations, or under the Secretary's general discretionary authority to administer leases in the public interest. In addition, a prosecution of a violation of a lease term, including a diligence requirement, might be temporarily "waived" or deferred by the Secretary's decision not to recommend initiation of a suit to cancel the lease or by the Justice Department's prosecutorial discretion to decline to initiate a suit requested by the Secretary. It must be noted, however, that the lease terms themselves have provided that a violation of the lease is not waived by the Department except in writing to the lessee (e.g., sec. 6(a) of 1920 lease form, 47 L.D. 489, 498 (1920)), and that the waiver extends only to the breach actually waived (sec. 3(e) of 1956 and 1967 forms).

Because of these authorities to extend and suspend the operation of the diligent development and continued operation requirements, it is difficult to quantify in any reliable fashion how much federal coal will be produced from what existing federal coal leases and when the production might commence, except by reference to the intentions of existing lessees. In addition, because of the manner in which the lease terms on diligent development and continued operation were administered prior to the issuance of the May 1976 regulations, there is not a substantial body of precedent on how these authorities are to be exercised. In the years immediately preceding the June 1, 1986, deadline for the initiation of commercial production from every existing federal lease LMU, the Department may have to "write the book" on how the Secretarial discretion to extend or suspend these requirements will be exercised.

3. Issues in implementation of diligence requirements.

Three more elements complicate establishing the timing and quantity of federal coal production over the next few years from existing leases in a systematic, reliable fashion. Resolution of the issues in the following discussion, and administration of the requirements set out below, will require substantial effort and cooperation among BLM, other offices of the Department, and the Department of Energy.

a. Readjustment of lease terms. Each existing coal lease is subject to readjustment every twenty years after issuance. For leases which will be readjusted in the near future, a number of changes in lease terms will be made that may greatly affect the lessee's plans with respect to development of his existing leases. (i) The royalty rate on production will increase to at least 12 1/2 percent of the gross value of the coal produced for surface-mined coal and at least 8 percent for underground coal. The first figure is statutory; the second regulatory (30 U.S.C. § 207, as amended; 43 CFR 3503.3-3(b) (1977)). This compares to current royalty rates as low as five cents per ton, the former statutory minimum royalty, and more commonly ten or fifteen cents per ton on many leases that are now or will soon be subject to readjustment. 5/ (ii) The lessee will be required to submit a mine plan on the lease not later than three years after its readjustment. 30 CFR 211.10(a)(1) (1977). This statutory diligence requirement was not an element of the Department's May 1976 regulations, but will be imposed so that each lease maintained after readjustment is consistent with the FCLAA. (30 U.S.C. § 207(c), as amended.) (iii) The lease will be expressly conditioned to be subject to the Department's unsuitability criteria.

Around 85 leases are currently subject to readjustment, and around 250 more existing leases will be subject to readjustment through 1986. Of the leases now subject to readjustment, about 51 leases had their twentieth anniversary date prior to the passage of the FCLAA. Some lessees in administrative proceedings now pending have challenged whether the BLM has the authority to readjust these leases at all, and if it can, whether the readjustment can include the imposition of FCLAA royalty and mining plan submission requirements, or only those royalty and diligence requirements applicable prior to passage of the FCLAA. The appeals have been briefed, and await decision by the Board of Land Appeals. If the Board affirms the BLM's position, the lessees may still seek judicial review of the issue.

b. Problems in enforcing the May 1976 regulations. Our analysis of the regulations has led us to ask the Solicitor's Office to answer a series of complicated questions dealing with the enforcement of the May 1976 diligence requirements. In brief, these questions relate to two central themes: (1) are the May 1976 regulations in any way inconsistent with the Mineral Leasing Act itself?; and (2) how do the individual lease diligence terms relate to the May 1976 regulations?

The first theme is derived from the limitations in the Mineral Leasing Act itself on the Secretary's authority to cancel a coal lease, found in section 31(a) of the Act, 30 U.S.C. § 188(a). The second theme is derived

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5/ Lessees who are unable to operate successfully under this higher lease term may petition to have the royalty reduced. 30 U.S.C. § 209; 43 CFR 3503.3-2(d) (1977).

from potential inconsistencies between the diligence provisions of specific leases issued between 1920 and 1976 and the diligence requirements of the May 1976 regulations. The Department, in promulgating the May 1976 regulations, made a number of assumptions about the nature and viability of the lease terms related to diligence that require close examination before any definite strategy for the enforcement of diligence requirements can be settled upon.

Without exploring the specific questions that inhere in these themes, we can set out the three possible scenarios that will unfold on the issue of enforcement of diligence requirements. First, if the questions raised in our analysis thus far are resolved to show that the May 1976 regulations were well-founded and enforceable, we will have the situation described above: existing leases will either be in production on June 1, 1986 or be subject to cancellation. If the questions asked lead to the answer that the May 1976 diligence regulations are by and large unenforceable, the Department will then turn to enforcing the diligence terms in the existing leases. Depending on the answers to a series of questions about the meaning of the lease terms themselves, this scenario may result either in the Department having the authority to enforce diligence requirements more strict than those in the May 1976 regulations, or the Department having to await lease readjustment before it can impose any effective, enforceable diligence requirements at all.

To summarize, there are three possible conclusions to this examination of the enforcement of diligence requirements: 1) the May 1976 diligence regulations may be enforced intact; 2) the Department will have the discretion to enforce lease diligence requirements at least as strict as the May 1976 regulations; or 3) the lease diligence terms will be found to be ineffective and the Department will have to await lease readjustment before it can impose effective diligence requirements.

The three possibilities are not as clearly distinct from each other as this summary indicates, and the Department may be in each of the three situations with respect to different classes of leases. We foresee this result because of changes in the diligence and other terms in the lease form, including changes made in 1956 and 1965 during the Department's most significant period of leasing. For example, the May 1976 regulations may be enforceable with respect to the more recent (post-1965) leases even if they are unenforceable with respect to earlier leases. For another example, changes in the lease diligence terms in 1956 and the manner in which the changed terms were administered may have rendered some diligence obligations in later leases unenforceable while the terms of earlier leases may still be fully enforceable. Thus each of the three possible situations outlined above with respect to enforcement of diligence obligations may, in the end, turn out to apply to some leases issued during certain periods on certain forms, or previously readjusted in a certain manner. The three situations, however, are the simplest accurate

characterizations of the postures in which the Department could stand when the questions that have been asked of the Solicitor's Office have been answered. We have asked the Solicitor's Office to give the questions that must be resolved to determine our diligence enforcement policies its highest priority.

c. Role of Department of Energy. While the Secretary remains solely responsible for the administration of existing leases, including the administration of the existing diligence regulations, only the Secretary of Energy is now authorized to promulgate regulations under the Mineral Leasing Act "which relate to the . . . establishment of diligence requirements for operations conducted on Federal [coal] leases . . .." (42 U.S.C. § 7152(b), (b)(3).) Thus any regulatory changes enacted on DOE's initiative, and any regulatory changes the Secretary of the Interior might seek after full consideration of the issues set out above, are the responsibility of the Secretary of Energy after consultation with the Secretary of the Interior. (42 U.S.C. § 7153(b).) As noted above, DOE has transmitted for Departmental review regulations that would establish new milestones to be met by a lessee in order to be diligently developing his lease.

D. DILIGENT DEVELOPMENT AND CONTINUED OPERATION ON LEASES ISSUED AFTER AUGUST 4, 1976.

Congress' revision of section 7 of the Mineral Leasing Act, 30 U.S.C. § 207, in section 6 of the FCLAA (90 Stat. 1087), has meant that all leases issued since August 4, 1976, and earlier leases readjusted after August 4, 1976, are subject to somewhat different diligence and continued operation requirements than leases issued prior to August 4, 1976, which were discussed above.

1. FCLAA requirements.

The first requirement of the FCLAA is almost identical to the Department's May 1976 regulations: the lessee must be producing coal in commercial quantities in the tenth lease year. Any lease which is not producing at that time shall be terminated. "Commercial quantities," undefined by the statute, is defined by the December 1976 regulations implementing the FCLAA to mean one percent of the LMU reserves. (43 CFR 3500.0-5(f)(1) (1977).) In contrast, the Department's May 1976 regulations defined "commercial quantities" for the purpose of measuring diligent development as two and one half percent of the LMU reserves. In addition, the lessee must produce at a rate that will result in the exhaustion of the reserves in forty years from the date of approval of a mine plan.

Second, the December 1976 regulations require continued operation in an amount equal to the pre-FCLAA lease requirements: production of one

percent of the LMU reserves annually, with computation on a three-year basis. (43 CFR 3500.0-5(g) (1977).)

Third, a provision of section 5 of the FCLAA, 30 U.S.C. § 201(d)(6), authorized the Secretary to require each (post-FCLAA) lessee to form a logical mining unit (LMU). The Secretary so provided in the December 1976 regulations. (43 CFR 3520.2-6(a) (1977).) Thus the diligent development and continued operation requirements apply to an LMU, strictly speaking, rather than a lease. To restate what is also true of LMU's containing pre-FCLAA leases, this allows: (1) production on nonfederal lands that are part of the lease LMU to count toward compliance with these regulatory requirements; and (2) federal leases to be combined into a single LMU for purposes of more sensible development from the perspective of both economics and resource conservation. (43 CFR 3520.2-6(b).)

Fourth, the Congress added the milestone requirement that the lessee submit a mine plan within three years of lease issuance. (30 CFR 211.10(a)(1) (1977).)

Fifth, the FCLAA has a separate, independent "diligence" requirement that will apply no matter what is the eventual resolution of the questions on the relationship between the lease and regulatory diligence requirements. Section 3 of the FCLAA prohibits the Secretary from issuing a lease to anyone who holds (or is affiliated with one who holds) a lease that has been held for ten years and is not producing coal in commercial quantities. (30 U.S.C. § 201(a)(2)(A).) This provision applies to leases issued before and after the FCLAA, and becomes effective on August 4, 1986. The Secretary has no authority to accelerate or delay this date; only the Congress can change it.

2. Extensions and modifications of requirements.

Section 7(b) of the Mineral Leasing Act (30 U.S.C. § 207(b)), although amended by the FCLAA, continues to authorize the Secretary to accept advance minimum royalty payments in lieu of continued operation. The statute requires the payments to be set on a fixed reserve-to-production ratio. Unlike the earlier lease clauses, however, the statute limits the number of years in which advance royalties can be accepted to ten, and prohibits the lessee from offsetting the advance royalties paid in the first twenty lease years against actual production royalties owed after the twentieth lease year.

The diligent development and continued operation requirements may be extended for the length of time operations "are interrupted by strikes, the elements, or casualties not attributable to the lessee." (30 U.S.C. § 207(b).)

The Secretary retains the authority to suspend a lease in its entirety in the interests of conservation under section 39 of the MLA (30 U.S.C. § 209.) This authority is discussed in part C.2.(c). above with respect to earlier leases.

The Congress' revision of the diligence requirements did not, however, leave the Secretary with the discretionary authority to defer compliance with the diligence and continued operation requirements in cases of advanced technology demonstration, development of large-scale mines, or firm delivery commitments for the lease coal after the ten-year period, as set out in part C.2.(b). above. (43 CFR 3520.2-5(c)(2).)

Although there are currently only 9 newly-issued and 11 readjusted leases subject to these provisions, it is again evident that it is difficult to predict with certainty when, within the ten-year period after issuance, a given lease will become productive. There is only the assurance that each lessee will submit its mine plan not later than three years after lease issuance, and produce coal in commercial quantities in the tenth lease year, or the lease shall be terminated.

3. Issues in implementation of diligence requirements.

Leases issued after August 4, 1976, do not contain specific provisions for diligent development and continued operation like those in older leases discussed at length above. Rather, they simply incorporate as the diligence requirements the applicable regulatory requirements, that is, the regulations issued December 29, 1976, to implement section 6 of the FCLAA, 30 U.S.C. § 207 (1976). (41 F.R. 56644.) Thus they present no issues of potential conflict between lease terms and regulatory requirements.

In addition, leases issued after August 3, 1977, are clearly and now expressly subject to the Department's unsuitability criteria, so that issues related to the exemption of lands from those criteria will be less likely to arise.

Finally, new leases as well as old are subject to the transfer of rulemaking authority related to diligence to the Department of Energy. To the extent these diligent development and continued operation requirements are not required by law, they are subject to amendment by the Secretary of Energy on his own initiative or at the request of the Secretary of the Interior.

E. ASSIGNMENTS OF LEASES.

Many leases are not presently held by those who first received them. Because there have been assertions that an undesirable speculative resale market exists in federal coal leases, the Department has begun to consider whether it should take any action to control the assignment market. In

turn, this requires the Department to examine its authority to deny or condition approval of lease assignments, especially on non-producing leases where the transfer would not clearly promote prompt development of the lease.

Section 30 of the Mineral Leasing Act, 30 U.S.C. § 187, provides, "That no lease issued under the authority of this Act shall be assigned or sublet, except with the consent of the Secretary of the Interior." This authority appears on its face to be without limitation, in contrast to the limited authority to disapprove oil and gas lease assignments contained in section 30a of the Act, 30 U.S.C. § 187a, under which the Secretary can only disapprove assignments where the assignee is unqualified to hold the lease or is unbonded.

Up to now, the Department has examined assignments only to assure compliance with a specific group of public purposes. First, the Department requires the assignor's lease account to be in good standing. All accrued rental and royalty obligations must have been paid, and any known violations of lease terms must be resolved, including compliance with reclamation or other environmental stipulations. (43 CFR 3506.2-4.)

Second, the Department is expected to examine and approve the assignee's qualifications. This includes: (1) computing acreage holdings to assure compliance with 43 CFR 3501.1-4(b)(1); determining the qualifications of the holder under the corporation or association information and citizenship requirements of 43 CFR Subpart 3502 (43 CFR 3506.2-2); (3) receiving a sufficient bond from the assignee, or consent from the assignor's surety to the substitution of the assignee on the bond (43 CFR 3506.2-3); 6/ and (4) evaluating whether the outstanding private royalty interests exceed fifty percent of the federal royalty interest (43 CFR 3503.3-2(c)(3)).

In addition to these considerations governing approval of assignments, the Assistant Secretary, Energy and Minerals, has asked the Solicitor's Office whether the statutory requirement that assignments be approved (30 U.S.C. § 187) allows the introduction of other considerations into the approval process. Specifically, could assignment approval be conditioned on acceptance of adjustment to the royalty, rental, or diligent development and continued operations provisions of the lease? As noted above, the general lease assignment provision, in contrast to the provision related to the assignment of oil and gas leases and Secretarial approval

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6/ For partial assignments, both the remaining interest of the assignor and the assignee's interest must be properly bonded. Bonding for reclamation liability will soon become an OSM function, and will drop out of consideration by BLM in approving assignments. OSM will have separate regulatory provisions governing the assignment of OSM permits to mine, and the rights and obligations attached to them.

of such assignments, 30 U.S.C. § 187a, is on its face without limitation. The existence of additional authority to condition approval of assignments could be of significance. If the answers to the questions posed in the diligence discussion above indicate that the May 1976 requirements and other lease diligence provisions may not be imposed on pre-FCLAA leases until the twenty-year readjustment comes due, some of those diligence policies might be implemented through the process of approval of lease assignments.

If the authority to condition or disapprove assignments for reasons not currently in the Department's regulations exists it might be exercised to prevent speculative sale and resale of coal leases even if none of the questions raised in the diligence discussion above are resolved in a manner that would frustrate existing diligence and continued operation policies. In any event, formulation of the issues suitable for policy guidance in this area must await legal guidance on the existence of any relevant limitations on the Secretary's authority to condition or disapprove assignments.

One policy that might be established in the exercise of additional authority to condition approval of assignments is review of assignments by the Justice Department for any inconsistency with the antitrust laws. Section 15 of the FCLAA requires antitrust review of lease issuance and readjustment. (30 U.S.C. § 184(1).) It does not expressly prohibit antitrust review at other points in the life of a coal lease.

F. ENVIRONMENTAL IMPACT STUDY STRATEGY.

1. Background.

As the Department completed its first programmatic coal leasing environmental statement (ES), and began to implement the Energy Minerals Activity Recommendation System (EMARS) (43 CFR Subpart 3525), it divided the major federal coal areas into regions and initiated studies of impacts of proposed federal coal development in each of the designated regions. The focus of each study was a Departmental projection of the probable level of federal coal leasing under the EMARS, and the probable level of federal coal development (through coal mine plan approvals by Geological Survey). The regional ES's discuss the cumulative impacts of different levels of specific lease issuance or mine plan approval decisions the Department might make. The Department did not, however, propose "coal development plans" for the regions covered in the statements.

At the same time, each regional statement includes site-specific analyses of each discrete proposal within the region that constitutes a major federal action. Some of the site-specific analyses may require supplemental work, to the extent the mine plans have been prepared and analyzed without fully accounting for the performance standards now applicable under SMCRA. The cumulative impacts of the several site-specific

proposals and the relation of each to expected non-federal regional coal development is embraced in the regional analysis portion of the regional ES.

At the time of the issuance of the District Court injunction in NRDC v. Hughes, the eight regional ES's included site-specific analyses of some 32 mine plan approval applications. They also considered new competitive coal leasing proposals. Because the injunction prohibited taking any action, directly or indirectly, to implement the program for new leasing, the Department ceased processing coal lease applications (except those which met the court's short-term criteria), and ceased work on all analysis in the regional ES's directly and exclusively related to new competitive coal leasing at a specific site. Specifically, the enjoined EMARS nominations, proposed leasing activities and the identification and study of leasing tracts were deleted. In lieu of specifically studying the proposed new leasing tracts in each region, the Department is calculating regional, cumulative impacts based on alternative coal development scenarios that might result from development of existing leases and possible new federal leasing, although at least one development scenario in every statement is based on no new federal leasing.

When the regional ES's are completed this year, the Department will have to make decisions on the 32 mine plans within the eight regions. In addition, there are three applications for mine plan approvals outside the areas covered by the regional ES's. These plans are being covered by separate site-specific ES's.

2. Mine plan approval under the new program.

If no new leasing is found to be required by the new programmatic study, environmental study of the development of existing leases would proceed in the context of the existing completed regional or comprehensive environmental statements. In other words, a site-specific environmental statement would be prepared by Geological Survey (or by OSM when it assumes this aspect of its function) as a lead agency in the approval of mine plans, especially for surface mines. The regional or cumulative impacts of the proposed operation would in many instances already be analyzed as part of an alternative development scenario of regional development. The regional impact portion of the mine plan ES would normally be limited to an analysis whether the proposal's impacts significantly depart from a regional development scenario already fully studied. Only if it is not would a full exploration of non-site specific matters be required. This is consistent with the newly revised Council on Environmental Quality regulations governing compliance with the National Environmental Policy Act (NEPA). (40 CFR 1502.20, 1508.28(b), 43 F.R. 55978 (November 29, 1978).)

If new leasing is found to be required, the Secretary's preferred alternative would be implemented by region-by-region identification of need for leasing, and regional tract delineation, ranking, selection, and sale scheduling. An integral element in the tract ranking, selection, and sale scheduling process, of course, will be environmental study of the tracts delineated in the regions where leasing will occur.

While half of the environmental study in this process will examine the impacts of developing the delineated tracts, the other half will be an examination of the regional impacts of the regional leasing proposal. The regional impact portion of the environmental study may, to the extent that the regional leasing proposal is consistent with a level of development that has already been studied in an the existing comprehensive ES, be simplified by the use of the analysis in the existing ES. The more fully developed regional environmental analysis will include a discussion of development of existing leases and may incorporate any pending mine plans as site-specific impact studies in the regional new-leasing statement. The Department may not have to do another environmental statement on mine plan approval for new leases; the specific and regional impacts should already have been fully discussed for NEPA purposes. Fresh environmental study of mine plans on existing lease cannot be avoided. It may be simplified, however, either by treatment of the mine plan on a site specific basis in a regional leasing ES, or if the timing of the studies prevents that, by use of the regional impact analysis from the prior comprehensive or regional leasing ES in the separate ES on the mine plan.

In regions in which no new leasing is necessary, environmental analysis of mine plans on federal leases could continue just as it has occurred in the regional ES's now being completed with no leasing proposals in them. Finally, if a mine plan is submitted on a lease that is outside all areas in regional environmental studies, it will be studied discretely unless there are other coal development proposals before the Department that would justify or require joint study.

III. NONCOMPETITIVE (PREFERENCE RIGHT) LEASE APPLICATIONS

A. REGIONAL LEASING TARGETS

The process by which regional leasing targets will be established is set out in part II.A. above. Potential production from preference right leases will be one important component of the expected regional production predictions from which leasing needs will be derived. As was indicated in Part I above, preference right lease applications embrace lands that are estimated to contain 9.9 billion tons of coal. The amount of that coal that will finally be leased and developed is and will be uncertain for some few years, since the applicants' entitlements to leases have not yet been determined, and the process of lease adjudication under

the Department's May 1976 regulations defining "commercial quantities" of coal incorporates environmental analysis under NEPA. Table V, also taken from Chapter 2 of the DES, shows the Department's best estimate of potential production from lands now under preference right lease application. It, like the table of planned production from existing leases discussed above, is derived from a systematic examination of pending lease applications.

B. UNSUITABILITY OF LANDS

1. How the criteria are applied.

The preceding discussion on the applicability of the unsuitability criteria to existing leases is generally applicable to preference right lease applications, but there are some significant differences. Most of the differences are derived from the fact that the noncompetitive lease applicant's right to the lease had not yet been adjudicated at the time the SMCRA was passed, so that application of the criteria will occur during, and as an integral part of, adjudication of the right to a lease.

Lands in preference right lease applications will have the criteria applied in the development of a land-use plan, or supplementation of an existing land-use plan, for the area if either action occurs prior to adjudication of the lease right itself. Application of the criteria will first be completed, then the exceptions to any relevant criterion will be applied. (The exceptions to each proposed criterion are set out in section 3461.2 of the example regulations with each criterion.) If a criterion applies, and no exception applies, the Bureau of Land Management or other surface management agency will determine whether the lease application is exempt from the criterion because of the source of authority for the criterion. As indicated in Part II.B.1 above, some criteria are subject to no exemptions, the application of some criteria is subject to "valid existing rights," and some criteria do not apply to the mining of lands on which mining permits have issued or in which substantial financial and legal commitments have been made.

If land-use planning, or the supplemental application of the unsuitability criteria to lands in existing land-use plans, has not occurred on the applied for lands at the time of lease right adjudication, the criteria will be applied as part of the adjudication process. Under the regulations for determining whether the applicant has discovered commercial quantities of coal, and thus has a right to a lease, the applicant first makes a showing containing the geological information about the thickness and quality of the coal deposits discovered during prospecting. (43 CFR 3521.1-1(b) (1977).) The Department then does a technical and environmental assessment designed to evaluate the applicant's showing and develop any necessary environmental protection or reclamation stipulations that the Secretary intends to impose on the lease. This latter step will include

application of the unsuitability criteria and their exceptions, and the determination whether the lands are exempt from the criteria. (See 43 CFR 3521.1-4, 3521.1-5 (1977).)

In this process, the determination that a criterion applies, but that an exception would also apply if appropriate mitigating steps were taken, could lead to the recommendation of a specific lease stipulation. Consistent with both the unsuitability process and the lease adjudication process, the Department would submit the recommended lease terms and stipulations to the applicant to allow the applicant to formulate his final showing, which includes estimates of the costs and revenues from the potential lease operation subject to those terms and stipulations. The adjudicator would then determine whether the applicant has discovered commercial quantities of coal and is entitled to a lease. (43 CFR 3521.1-1(c) (1977).) This process was approved (although not in direct reference to unsuitability) as complying both with NEPA and the noncompetitive leasing provisions of the Mineral Leasing Act in Natural Resources Defense Council (NRDC) v. Berklund, 458 F. Supp. 925 (D.D.C. 1978), appeal pending.

For example, the land could be assessed as a wilderness study area by the BLM, but because an underground mine is involved, stipulations to control the location of the mine portal and surface facilities, and mining method stipulations to prevent or mitigate subsidence, would assure nonimpairment of wilderness suitability. The relevant exception to the criterion would be found to be applicable, and the applicant's entitlement to a lease would be determined on the basis of those stipulations.

2. Unsuitability designations.

As would be the case with existing leases, formal designation of lands would be a separate step from application of the criteria, and would occur only in response to a petition. With respect to lands in noncompetitive lease applications, the petition process could occur either prior to the adjudication of the lease right, by itself or during land-use planning, or in the adjudication process itself. The environmental assessment on the lease application might, for instance, recommend that certain areas of the tract be assessed or designated unsuitable for all or certain kinds of surface mining operations. One of three things would then occur.

First, if the lease applicant is exempt for whatever reason from assessment or designation of those applied for lands as unsuitable, the Department may seek to initiate an exchange of lease rights for that area or, if it appears to be in the public interest, the entire lease. Exchanges are discussed in greater detail below. If the lease applicant were uninterested in an exchange, then the lands could not be designated unsuitable

nor mining prohibited, and adjudication of the lease application would have to proceed. Even though mining on that area or in that manner could not be prohibited by formal designation, the Secretary could still include reasonable mitigating stipulations in the proposed lease on which the applicant would make its final showing.

Second, if the lease applicant is not exempt from designation, formal designation as unsuitable or prohibition would occur and the lease applicant could elect whether to delete the unsuitable lands from the application as adjudication proceeds. This is the Department's construction of the language of the former preference right leasing provision, 30 U.S.C. § 201(b) (1970), that

> if . . . the permittee shows to the Secretary that the land contains coal in commercial quantities, the permittee shall be entitled to a lease . . . for all or part of the land in his permit. (Emphasis added.)

In our view, the U.S. District Court in NRDC v. Berklund did not reject this construction. (458 F. Supp. at 938, discussed in Memorandum of November 2, 1978, cited above, "Legal Issues in the Draft Coal Regulations.") The "costs" and "revenues" of mining the prohibited tract or of mining in the prohibited manner would simply drop out of the calculations leading to the determination of "commercial quantities," and the lands would not be leased.

Third, if the lands are designated as unsuitable or mining is prohibited, and the applicant chooses not to delete them from the application, the Department will have to formulate a method for determining the costs and revenues of mining a tract or deposit that would be included in the lease, but which the lessee would be prohibited from mining unless and until (i) improvements in mining or reclamation technology brought the land or deposit under an exception and the designation as unsuitable or mining prohibition was terminated; or (ii) the unsuitability criteria are amended to delete the criterion prohibiting mining on the tract or deposit in question.

The two immediately preceding options in this section 2 raise an issue that deserves discussion at this point. The noncompetitive lease applicant's application for a lease is a "valid existing right" saved from the repeal of the noncompetitive leasing provision of the Mineral Leasing Act by section 4 of the FCLAA, 90 Stat. 1085-1086. This "valid existing right," the fact that the noncompetitive lease applicant has the right to adjudication of his entitlement to the lease, and a right to the lease if he is found entitled, does not mean that the applied for lands are automatically exempt from the application of the unsuitability criteria. In other words, the right to have entitlement to a lease adjudicated is

substantially different from and substantially less than an unencumbered right to a lease that contains no restrictions on the lessee's authority to mine certain coal or to mine using certain methods. Thus, a company's holding a preference right lease application alone is not "substantial legal and financial commitments" that would exempt the applicant from unsuitability designations based on criteria derived from section 522(a) of SMCRA, where that phrase for exemptions is found. More importantly, the pendency of a preference right lease application is not per se the existence of a "valid existing right" to mine that would exempt the lease applicant from designation of the applied for lands as unsuitable because of criteria derived from section 522(e) of SMCRA, where that phrase for exemptions is found. The crucial distinction the Department has concluded the Congress intended in the application of these criteria is the difference between a valid right to mine that land or to mine it in a certain manner and a valid right to have one's entitlement to a lease determined.

For instance, the Congress could not have intended to give noncompetitive lease applicants greater protection from unsuitability designation than it gave to existing lessees. This is especially true in light of the fact that the Department has long held that a noncompetitive lease applicant may earn a right to a lease, but that he does not have the right to a lease containing any specific terms or on any specific form. (Montana Eastern Pipe Line Co., 55 I.D. 189, 191 (1935).) It is clear to the Department that the Congress may alter the terms under which leases will be issued after a certain date and that those terms will apply to non-competitive as well as competitive leases issued after that date. Thus the Department regards noncompetitive leases issued after August 4, 1976, as subject to the royalty and diligent development requirements of section 6 of the FCLAA (30 U.S.C. § 207, as amended), and leases issued after August 3, 1977, as subject to the unsuitability assessment and designation authorities of section 522 of SMCRA, except as the Congress itself limited the coverage of section 522. (See Memorandum of November 2, 1978, cited above, "Legal Issues in the Draft Coal Regulations.")

3. Petitions to designate lands.

The petition process established by section 522(c) of SMCRA applies to lands under preference right lease application as well as it does to any other lands. The process itself is amply set out in Part II.B.2. above, and need not be repeated. How actual designation applies to noncompetitive lease applicants and lands in those applications is set out in the section above (III.B.2.). The filing of a proper petition on lands in a preference right lease application will probably activate the technical and environmental assessment for adjudication of that lease application, since the examination of the lands in response to the petition, and the findings to be made after any hearing on the petition are, as discussed above, an integral part of the determination of appropriate lease stipulations, and thus of the commercial quantities determination.

4. Exchange of unsuitable lands.

The same authorities set out and discussed in Part II.B.3. above are applicable to exchanges arising out of noncompetitive lease applications: lease application for coal lease if the lease application is in an alluvial valley floor; lease application for other mineral lease, coal lease modifications or future lease sale bidding rights if it is not. In addition, on October 30, 1978, the Secretary was authorized to consummate a "lease" exchange for 8 preference right lease applications held by Utah Power and Light Company in the Kaiparowits Plateau area of Southern Utah. (Section 1(a) of P.L. 95-554, 92 Stat. 2073.)

The same difficulties that attend lease-for-lease exchanges also attend the exchange of a preference right lease application for a lease but some additional questions arise. The Department's December 1977 exchange regulations require that the Secretary determine that the lease applicant has a preference right to a lease before he can consummate an exchange. With the class of exchanges motivated by the fact that the lease applicant is exempt from designation of the lands as unsuitable though criteria clearly apply to the lands, this presents no problem. When the Secretary determines, upon the applicant's final showing, that the applicant discovered commercial quantities of coal on the lands, the lease would issue unless an exchange is proffered and consummated (or legislation to prevent the mining by condemnation or otherwise is sought).

In cases where the unsuitability criteria do apply, the requirement that the right to a lease must be determined may moot the exchange. When the lease applicant demonstrates that he is entitled to a lease even when the costs of complying with protective or mitigating stipulations are considered, and even if the applicant deletes portions of the lands from the application or some types of mining are prohibited by designation, the motivation for an exchange may be gone. The lease applicant will have designed an approximate plan of operation to complete its final showing, and will have committed itself to that extent to that operation. It will also have a clear concept of the economic desirability of the operation. From the Department's view, it does not on its face appear to be in the public interest to try to prevent (by exchange) operations for which the operator has demonstrated that he can make a profit even when all reasonable environmental protections and mitigating measures are taken in account in that determination.

The motivation for an exchange is strongest prior to assessment or designation of the lands as unsuitable and determination of the right to a lease. The applicant seeks to avoid the risk of being found to have no right to a lease, and to avoid the time and expense of formulating and establishing the economics of a plan of operations it is not interested in carrying out. The United States seeks to avoid the risk that the applicant will prove commercial quantities and proceed to mine the tract

in question, and to avoid the time and expense of an environmental assessment, or possibly an environmental statement, to formulate lease terms and protective stipulations for a lease on lands which no one wants to have mined.

As was stated above, the present exchange regulations require that the determination of entitlement be made before an exchange may be consummated. The formulation of policies whether to delete this requirement or not must await guidance on two questions: (a) is it lawful for the Secretary to determine the existence of commercial quantities of coal without having completed the procedures set out in the May 1976 commercial quantities regulations (43 CFR Part 3521); and (b) is it lawful to issue a lease or lease rights in exchange for the relinquishment of a preference right lease application on which a commercial quantities determination has not been made?

5. Unclaimed, undeveloped lands.

There is one additional complicating factor in the process of noncompetitive lease right adjudication, the impact of which is not yet quantified. While it is not strictly an "unsuitability" question, it will affect how many lease applicants will be entitled to leases and how much acreage is eventually leased in response to preference right lease applications.

The coal prospecting permit provision of the Mineral Leasing Act, prior to its amendment in 1976 by the FCLAA, authorized the issuance of permits only on "unclaimed, undeveloped" lands. The preference right lease applications now pending before the Department are derived from permits which were issued without any showing by the applicant or finding by the Department that the lands were "unclaimed" and "undeveloped."

In Solicitor's Opinion M-36893, 84 I.D. 442 (1977), the Solicitor concluded that permits (and preference right lease applications based on them) issued on "claimed" lands were potentially void for those lands. That opinion chiefly dealt with the threshold question whether that statutory phrase was still viable or had been repealed by implication. Since the Solicitor concluded that the statutory phrase was still viable, the BLM has asked a follow-up series of questions about: (1) the meaning of the term "undeveloped;" (2) what types of claims may void a lease application—currently valid claims, claims valid when the permit issued, or mere subsisting locations; and (3) what procedures should be used to resolve the potential conflicts. This last question asks whether the lease applicant must contest the mining claim, whether the BLM must challenge the validity of the permit or whether the mining claimant must challenge the permit.

All coal preference right lease applicants were directed in August and September 1977 to submit title abstracts for the permit lands to establish whether any mining claims exist on the lands. BLM needs to have the answers to its follow-up questions, however, before it can integrate this step into the process of adjudicating rights to leases on those applications found to contain lands subject to mining claims. BLM Coal Task Force 124 reported in May 1978 that abstracts submitted for 118 applications revealed 20 applications overlying 465 mining claims.

C. DILIGENT DEVELOPMENT AND CONTINUED OPERATION

1. What requirements apply?

As set out in the unsuitability discussion above, the Department has long maintained that a preference right lease applicant has no right to a lease containing specific terms or on a specific lease form. (Montana Eastern Pipe Line Co., 55 I.D. 189, 191 (1935).) Both competitive and noncompetitive leases issued prior to August 4, 1976, were issued on the same forms subject to the identical diligence and royalty requirements—those established by section 7 of the Mineral Leasing Act. (30 U.S.C. § 207 (1970).) Likewise, the Department regards both competitive and noncompetitive leases issued after August 4, 1976, to be subject to the same lease requirements—those established by section 6 of the FCLAA. (90 Stat. 1087, 30 U.S.C. § 207 (1976). Memorandum of November 2, 1978, cited above, "Legal Issues in the Draft Coal Regulations.")

The requirements of the FCLAA for diligent development and continued operation are set out in Part II.D.1 above. They are fully applicable.

In addition, the authorities to extend and defer compliance with these requirements are identical for preference right and competitive leases. These are set out in Part II.D.2. above.

2. Issues in implementation of diligence requirements.

The current lease form does not contain specific diligence provisions. Rather, it incorporates the applicable regulatory diligence requirements. These leases are, of course, subject to the authority of the Department of Energy to promulgate regulations related to diligent development and continued operation. They are also subject to the requirements of SMCRA with respect to the permitting of operations and, consistent with the exemptions discussed above, the application of unsuitability criteria, including the petition process. There are some points worth mentioning about operations under preference right leases.

First, in the course of establishing his right to the lease, the applicant will have devised something which approximates a draft plan of operations

for the lease. Because of that investment and the momentum the adjudication process will provide, the Department assumes that preference right leases issued during the program may be developed more promptly than existing leases on which there is not even the requirement to submit a mine plan in three years. This may not be true in every case, but it will be a consideration in the formulation of potential coal supply predictions in regions where preference right leases are being issued. In any event, as new leases, preference right leases will be subject to the requirement that a mine plan be submitted in three years.

Second is an issue that is not strictly a diligence matter, but it is certainly a matter to be considered when production from potential preference right leases is factored into regional coal supply and demand evaluations. The revised section 7 of the Mineral Leasing Act establishes minimum royalty requirements, but it establishes no maximums. (30 U.S.C. § 207 (1976).) The statute does not provide that preference right lease applications must be processed on the assumption that the statutory minimum royalty will be applied to the lease. Clearly the establishment of a policy to impose higher royalties could have major impact. For instance, all preference right lease applications could be adjudicated using the minimum royalty figures to determine the applicant's entitlement to a lease. As a matter of policy the Department would then calculate what higher royalty, if any, should be set in the lease to be issued in order to capture for the United States the fair market value of coal leased noncompetitively. On leases that meet the commercial quantities test without any more than the reasonable profit that earns the entitlement to a lease, the royalty would be set at or near the minimum rates. On leases where the minimum royalty rate would allow the lessee a substantial surplus or windfall profit, the royalty would be raised above the minimum accordingly.

Policy on this question is important for two other reasons. First, a similar issue is present in the readjustment of existing coal leases. It appears that readjustment of royalty may be the opportunity for the Department to establish its right to the fair market value of production from leases, especially nonproducing leases, that were issued noncompetitively or "competitively" for insignificant bonuses. Second, policy in this area must be mindful of the fact that some land owners, who hold coal that is most properly developed in conjunction with federal leases, provide in their private leases that the applicable royalty will be that established in the federal lease for the adjacent federal coal. Any policy to maximize royalty payments on such leases may directly result in increases in the cost to the lessee of private coal being developed in conjunction with the federal lease, which may be passed directly to the utility company or other purchaser of the federal and nonfederal coal.

D. ENVIRONMENTAL IMPACT STUDY STRATEGY

In NRDC v. Berklund, 458 F. Supp. 925 (D.D.C. 1978), which is now before the Court of Appeals, the U.S. District Court held that the National Environmental Policy Act fully applies to preference right lease issuance. It held that the Secretary's lack of residual discretion to reject an application once he determines that the applicant has shown commercial quantities of coal on the lands does not render NEPA inapplicable. It also held that the scope of the "proposed action" on which the Department must determine whether an environmental statement is required is the whole lease and potential operations thereon, not just the portion of the proposal with respect to which the Secretary has the discretion to formulate lease terms and mitigating measures. Unless and until the Court of Appeals for the District of Columbia Circuit reverses Berklund, the Department will follow its directives on how to implement NEPA in preference right leasing.

1. NEPA compliance and unsuitability determinations.

As set out above, the adjudication of a preference right lease application includes an environmental assessment of the potential operation. Whether this assessment will be a formal environmental statement will be determined, using normal NEPA standards and considering the full scope of the impacts of the potential lease operations, in response to the applicant's initial showing regarding the coal discovered in the tract. Again as indicated above, the unsuitability criteria will be applied, exceptions considered, and exemptions evaluated, as part of this environmental assessment. The imposition of protective stipulations on lease operations or the designation of some or all of the lands as unsuitable for some or all types of mining operations will be considered as mitigating measures and alternatives, respectively, in this analysis. Exchange of lease rights or legislation to authorize lease-for-lease exchange or purchase of the lease rights may be alternatives considered in the analysis.

Complete environmental analysis of potential lease operations will thus be completed as part of the adjudication of the applicant's entitlement to the lease.

2. Mine plan environmental analysis.

Because of the full environmental study that will have been completed in the process of lease adjudication, mine plan approval may be shortened and simplified. To the extent that the mine plan submitted for approval does not deviate from that studied in lease issuance, and to the extent that adjudication of the entitlement to a lease included the costs of compliance with lease stipulations and predicted performance conditions related to proper reclamation under SMCRA, no duplicative environmental

analysis or impact statement will be required. Only where the mine plan deviates from that studied in lease adjudication, and where the OSM's participation in predicting permit terms cannot be complete, or the reclamation standards change (or unsuitability designations are terminated), will new environmental review or a new environmental statement be required. Even though a different agency (Geological Survey or OSM) will be the lead agency on this analysis, the process of surface mining permit or mine plan approval should be vastly simplified by the environmental review completed during lease adjudication.

3. Relation to program environmental studies.

If adjudication of a preference right lease were occurring while a regional environmental statement were being completed for proposed competitive lease tracts in that region, the assessment for the preference right lease could become part of that regional study, most likely as a site-specific study as part of the regional lease sale statement. It would then be treated much like a site-specific study of a mine plan on an existing lease is treated in one of the current regional environmental statements. Under the third program alternative, in which preference right leasing would occur to the exclusion of competitive leasing (DES Ch. 3.1.3), the Department could do case-by-case environmental study, or in areas containing numerous preference right lease applications, "regional" preference right leasing environmental statements could be formulated. Whether the latter would be a sensible strategy would depend on how the priorities for the adjudication of the pending preference right lease applications would be established: according to degree of potential environmental damage; according to regional demand; or according to length of time pending.

IV. CONCLUSIONS

Two things are immediately clear on examining the status of existing federal coal leases and preference right lease applications: they may contribute significantly to meeting coal production goals in the regions where they are; and their administration may well require a significant share of the Department's manpower and resources that are devoted to coal.

Another point, however, is also evident from the preceding text: the administration of existing leases (and to a lesser extent preference right lease applications) is subject to substantial uncertainty until a number of legal and policy issues are resolved. Until a comprehensive road map to application of the diligence requirements on existing leases is developed, it will be difficult to predict when existing leases will come into production until mine plans are submitted for them. Until existing land-use plans in federal coal areas have been supplemented with updates that apply the Department's unsuitability criteria, it will

be difficult to predict how severely they will affect development plans and production potential from existing leases and lease applications, and what sorts of challenges may be mounted to their application.

The Solicitor's Office has been asked to give expedited consideration to the legal questions identified above, and this office will prepare any necessary decision option document on the policy issues that are outlined above, and that may arise out of the conclusions reached by the Solicitor's Office on the legal questions.

Steven P. Quarles

cc: Assistant Secretary, Energy and Minerals
Assistant Secretary, Policy, Budget & Administration
Director, Bureau of Land Management
Director, Geological Survey
Director, Office of Surface Mining

bcc:
Docket DER RF DER Onshore Minerals RF L. McBride R. Uram
S. Quarles (OCLPP&C) C. Rech (BLM)
LGMcBride:sal:3-14-79:x4803
Rewritten:LGMcBride/SQuarles:sal:3-20-79:x4803

APPENDIX J

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

This appendix lists the counties which are located either partially or totally within the regional boundaries indicated in Figure 1-1. These are the counties presently intended for the official description of the Federal coal production regions should the preferred program be adopted. Except for minor variations they are basically those listed in Appendix H, Table H-6 (the list of counties utilized in this statement for impact analyses). The Federal coal production regions were chosen on the basis of major coal basins, transportation networks, similar regional destinations, etc., after formulation of the CIEP impact matrices. The minor differences in counties would cause no, or extremely trivial, changes in the impact projections.

TABLE J-1

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

APPALACHIAN COAL REGION

Northern Appalachian Coal Region

Maryland	Ohio	Pennsylvania	West Virginia
Allegany	Athens	Allegheny	Barbour
Garrett	Belmont	Armstrong	Braxton
	Carroll	Beaver	Brooke
	Columbiana	Bedford	Calhoun
	Coshocton	Blair	Doddridge
	Fairfield	Butler	Gilmer
	Gallia	Cambria	Grant
	Guernsey	Cameron	Hancock
	Harrison	Centre	Harrison
	Hocking	Clarion	Jackson
	Holmes	Clearfield	Lewis
	Jackson	Clinton	Marion
	Jefferson	Crawford	Marshall
	Lawrence	Elk	Mineral
	Mahoning	Fayette	Monongalia
	Meigs	Forest	Ohio
	Monroe	Fulton	Pendleton
	Morgan	Greene	Pleasants
	Muskingun	Huntingdon	Preston
	Noble	Indiana	Randolph
	Perry	Jefferson	Ritchie
	Pike	Lawrence	Roane
	Portage	Lycoming	Taylor
	Scioto	McKean	Rucker
	Stark	Mercer	Tyler
	Summit	Potter	Upshur
	Trumbull	Somerset	Webster
	Tuscarawas	Tioga	Wetzel
	Vinton	Venango	Wirt
	Washington	Warren	Wood
	Wayne	Washington	
		Westmoreland	

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

Central Appalachian Coal Region

Kentucky	Tennessee	Virginia	West Virginia
Bell	Anderson	Buchanan	Boone
Boyd	Campbell	Dickenson	Cabell
Breathitt	Claiborne	Lee	Clay
Carter	Cumberland	Russell	Fayette
Clay	Fentress	Scott	Greenbrier
Clinton	Morgan	Tazewell	Kanawha
Elliott	Overton	Wise	Lincoln
Floyd	Pickett		Logan
Greenup	Roane		Mason
Harlan	Scott		McDowell
Jackson			Mercer
Johnson			Mingo
Knott			Nicholas
Knox			Pocahontas
Laurel			Putnam
Lawrence			Raleigh
Lee			Summers
Leslie			Wayne
Letcher			Wyoming
Magoffin			
Martin			
McCreary			
Menifee			
Morgan			
Owsley			
Perry			
Pike			
Powell			
Pulaski			
Rockcastle			
Russell			
Wayne			
Whitley			
Wolfe			

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

Southern Appalachian Coal Region

Alabama	Georgia	Tennessee
Bibb	Catoosa	Bledsoe
Blount	Chattooga	Franklin
Cherokee	Dade	Grundy
Cullman	Walker	Hamilton
De Kalb		Marion
Etowah		Putnam
Fayette		Rhea
Franklin		Sequatchie
Greene		Van Buren
Hale		Warren
Jackson		White
Jefferson		
Lamar		
Lawrence		
Madison		
Marion		
Marshall		
Morgan		
Pickens		
Shelby		
St. Clair		
Tuscaloosa		
Walker		
Winston		

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

EASTERN INTERIOR COAL REGION

Illinois

Adams
Bond
Brown
Bureau
Calhoun
Cass
Champaign
Christian
Clark
Clay
Clinton
Coles
Crawford
Cumberland
De Witt
Douglas
Edgar
Edwards
Effingham
Fayette
Ford
Franklin
Fulton
Gallatin
Greene
Grundy
Hamilton
Hancock
Hardin
Henderson
Henry
Iroquois
Jackson
Jasper
Jefferson
Jersey
Johnson
Kendall
Knox

Illinois (cont.)

La Salle
Lawrence
Lee
Livingston
Logan
Macon
Macoupin
Madison
Marion
Marshall
Mason
McDonough
McLean
Menard
Mercer
Monroe
Montgomery
Morgan
Moultrie
Peoria
Perry
Piatt
Pike
Pope
Randolph
Richland
Rock Island
Saint Clair
Saline
Sangamon
Schuyler
Scott
Shelby
Stark
Tazewell
Union
Vermilion
Wabash

Illinois (cont.)

Warren
Washington
Wayne
White
Will
Williamson
Woodford

Indiana

Benton
Clay
Daviess
Dubois
Fountain
Gibson
Greene
Knox
Martin
Montgomery
Owen
Parke
Perry
Pike
Rosey
Putnam
Spencer
Sullivan
Vanderburgh
Vermillion
Vigo
Warren
Warrick
White

Kentucky

Butler
Caldwell
Christian
Crittenden
Daviess
Edmonson
Grayson
Hancock
Henderson
Hopkins
Logan
McLean
Muhlenberg
Ohio
Todd
Union
Warren
Webster

Iowa

Muscatine
Scott

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

WESTERN INTERIOR COAL REGION

Arkansas	Iowa	Iowa (cont.)	Kansas
Crawford	Adair	Ringgold	Anderson
Franklin	Adams	Sac	Atchison
Johnson	Appanoose	Shelby	Brown
Logan	Audubon	Story	Chase
Pope	Boone	Tama	Chautauqua
Scott	Calhoun	Taylor	Coffey
Sebastian	Carroll	Union	Doniphan
Yell	Cass	Van Buren	Douglas
	Clarke	Wapello	Elk
	Crawford	Warren	Franklin
	Dallas	Wayne	Greenwood
	Davis	Webster	Jackson
	Decatur	Wright	Jefferson
	Franklin		Johnson
	Fremont		Leavenworth
	Greene		Linn
	Grundy		Lyon
	Guthrie		Marshall
	Hamilton		Miami
	Hardin		Morris
	Harrison		Nemaha
	Henry		Osage
	Humboldt		Pottawatomie
	Jasper		Riley
	Jefferson		Shawnee
	Keokuk		Washington
	Lee		Wyandotte
	Lucas		
	Madison		
	Mahaska		
	Marion		
	Marshall		
	Mills		
	Monroe		
	Montgomery		
	Page		
	Pocahontas		
	Polk		
	Pottawattamie		
	Poweshiek		

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

WESTERN INTERIOR REGION (Continued)

Missouri	Missouri (cont.)	Nebraska	Oklahoma
Adair	Jasper	Cass	Atoka
Andrew	Johnson	Douglas	Coal
Atchison	Knox	Johnson	Creek
Audrain	Lafayette	Nemaha	Haskell
Barton	Lincoln	Otoe	Hughes
Bates	Linn	Pawnee	Latimer
Benton	Livingston	Richardson	Le Flore
Boone	Macon	Sarpy	Mayes
Buchanan	Marion	Washington	McIntosh
Caldwell	Mercer		Muskogee
Callaway	Monroe		Nowata
Carroll	Montgomery		Okfuskee
Cass	Nodaway		Okmulgee
Cedar	Pettis		Osage
Chariton	Pike		Pawnee
Clark	Platte		Pittsburg
Clay	Putnam		Pontotoc
Clinton	Ralls		Rogers
Dade	Randolph		Seminole
Daviess	Ray		Sequoyah
De Kalb	Saline		Tulsa
Gentry	Schuyler		Wagoner
Grundy	Scotland		Washington
Harrison	Shelby		
Henry	St. Clair		
Holt	Sullivan		
Howard	Vernon		
Jackson	Worth		

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

TEXAS COAL REGION

Texas	Texas (cont.)	Arkansas	Louisiana
Anderson	Limestone	Miller	Caddo
Angelina	Madison		De Soto
Atascosa	Marion		Natchitoches
Bastrop	Medina		Sabine
Bexar	Milam		
Bowie	Morris		
Brazos	Nacogdoches		
Burleson	Navarro		
Caldwell	Panola		
Camp	Rains		
Cass	Robertson		
Cherokee	Rusk		
Dimmit	San Augustine		
Fayette	Shelby		
Franklin	Smith		
Freestone	Titus		
Frio	Trinity		
Gregg	Upshur		
Grimes	Van Zandt		
Guadalupe	Walker		
Harrison	Washington		
Henderson	Williamson		
Hopkins	Wilson		
Houston	Wood		
Lee	Zavala		
Leon			

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

GREEN RIVER-HAMS FORK COAL REGION

Colorado	Wyoming	Utah
Grand	Albany	Morgan
Jackson	Carbon	Summit
Moffat	Fremont	
Routt	Hot Springs	
	Lincoln	
	Park	
	Sublette	
	Sweetwater	
	Teton	
	Uinta	
	Washakie	
	Big Horn	

POWDER RIVER COAL REGION

Montana	Wyoming
Big Horn	Campbell
Garfield	Converse
Golden Valley	Crook
Mussellshell	Johnson
Powder River	Natrona
Rosebud	Niobrara
Treasure	Sheridan
Yellowstone	Weston

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

FORT UNION COAL REGION

Montana	North Dakota	North Dakota (cont.)	South Dakota
Carter	Adams	McKenzie	Butte
Custer	Billings	McLean	Corson
Daniels	Bowman	Mercer	Dewey
Dawson	Burke	Morton	Harding
Fallon	Burleigh	Mountrail	Meade
McCone	Divide	Oliver	Perkins
Prairie	Dunn	Renville	Ziebach
Richland	Emmons	Sheridan	
Roosevelt	Golden Valley	Sioux	
Sheridan	Grant	Slope	
Wibaux	Hettinger	Stark	
Valley	Kidder	Ward	
	McHenry	Williams	

SAN JUAN RIVER

Colorado	New Mexico	Utah
Archuleta	Bernalilio	San Juan
Dolores	Catron	
La Plata	Lincoln	
Montezuma	Los Alamos	
Montrose	McKinley	
Ouray	Rio Arriba	
San Juan	Sandoval	
San Miguel	San Juan	
	Sante Fe	
	Socorro	
	Valencia	

TABLE J-1 (continued)

FEDERAL COAL PRODUCTION REGIONS BY COUNTY

UINTA-SOUTHWESTERN UTAH COAL REGION

Colorado	Utah
Delta	Carbon
Garfield	Duchesne
Gunnison	Emergy
Mesa	Garfield
Pitkin	Grand
Rio Blanco	Iron
	Kane
	Sanpete
	Sevier
	Uintah
	Utah
	Wasatch
	Washington
	Wayne

DENVER-RATON MESA COAL REGION

Colorado	New Mexico
Adams	Colfax
Arapahoe	
Boulder	
Denver	
Douglas	
Elbert	
El Paso	
Fremont	
Huerfano	
Jefferson	
Las Animas	
Morgan	
Park	
Weld	

APPENDIX K

LETTERS OF COMMENT

INTERMOUNTAIN EXPLORATION COMPANY

P.O. Box 473
Boulder City, Nevada 89005
(702) 293-1098

010

January 16, 1979

Office of Coal Management (140)
Bureau of Land Management
Room 3610
18th and C Streets, N.W.
Washington, D.C. 20240

Comments on Draft Environmental Statement
Federal Coal Management Program

Gentlemen:

There is absolutely no way this company can afford the time and manpower to review the above "draft". Neither can be begin to comply with existing regulations on surface mining of coal. We are immediately terminating any and all existing participation or exploration in the coal industry.

Very truly yours,

Richard V. Wyman
President

RVW:tag

1103 - 26th Avenue South
Fargo, North Dakota 58103

January 22, 1979

017

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets
Washington, D.C. 20240

Good Morning!

On January 10 in Bismarck, North Dakota, I had the priviledge of hearing Steven P. Quarles and his associates discuss the principal features of the proposed Federal Coal Management Program, and I have been studying some of the details of the program as presented in the Draft Environmental Statement (DES) dated December 1978. As a citizen I am concerned about preserving our environment, with full recognition of the important role that inexpensive energy plays in maintaining a desirable human environment in modern times. As a result of this concern, I feel compelled to comment on the proposed coal management program.

I believe that a well planned program is absolutely essential, because the nation needs more coal production to help reduce its dependence on petroleum fuels. Since the Federal Government owns a large part of the national coal reserves its actions may have significant effects on industry's capacity to produce coal. Also I believe that a good program established by legislative and executive action would be preferable to one that grows like Topsy out of a hodge-podge of court decisions. The "preferred program" described in the DES is in every respect more desirable than any of the alternate programs described. None of them would be acceptable either because they ignore the nation's need for the coal or because they fail to fully protect the public interest in a valuable public resource.

Despite my general approval, I have some grave reservations about certain parts of the plan, some of which seem to contradict its basic aim, that is, to insure that the Federal Government contributes its fair share of the energy resources needed for society. The "unsuitability criteria," it seems to me, are likely to prevent the development of federal coal rather than to provide appropriate safeguards for its orderly development at a rate consistent with National energy needs. Individuals or groups who wish to block all future new mines could claim that one or another of the unsuitability criteria as written could be applied to virtually every tract of federal coal land no matter where located. For example, the criteria state, in effect, that any land which might be considered suitable for inclusion in a Federal Land System, a Wilderness Study Area, or a scenic area "shall be considered unsuitable for coal mining" - not just the existing Wilderness

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Areas and restricted use land, but any land that might be considered for such use at some future date.

Another unnecessary restriction is in connection with leasing of coal under "prime farm lands," presumably because such land is more valuable to society for farming than for energy production. Nothing could be farther from the truth. The value of agricultural production that might be lost to coal development would be only a small fraction of one percent of the local farm product, even if mining were to keep the land out of agricultural production permanently. It is absurd, of course, to assume that truly "prime" land could not be reclaimed so as to produce all or most of its pre-mining potential.

A third unnecessary restriction is the provision for allowing the surface owner to have final or irrevocable veto power over the leasing of federal coal. Despite assurances to the contrary, this seems to me to give the surface owner a substantial though unmeasured part of the value of coal that rightfully belongs to the government. True, the surface owner must be fully compensated for any and all damages done by the mining process, but the final word as to whether federal coal should be mined must remain with the people, ie. the federal government.

The checkerboard pattern of coal land ownership so common in many parts of the west further complicates the problem. A determined group of minority interests with the tacit approval of an Administration that happened to be hostile to mining could effectively confiscate privately owned coal property in such checkerboard areas by preventing the leasing of the federal coal, thus blocking access to the private coal.

In closing, I wish to state that I am not "owned" by any coal company - I have no financial interest in either coal or electric power except as a consumer. I do not want to see any irresponsible company, or unit of government either, despoil the landscape by strip mining without using proper reclamation procedures. However, I believe the reclamation laws, both state and federal, are fully capable of protecting the public interest. There is no need for the Federal Coal Management Program to further restrict the actions of mining companies who are operating in areas where federal coal ownership is common.

One reason why I object to certain elements of the plan is that in almost every case the decision to lease or not lease a particular tract of land could be made on the basis of subjective judgement alone, without much attention to the practical or economic aspects of the matter. I would be pleased to suggest less restrictive language for parts of the final DES if you think it would be appropriate.

Sincerely yours,

Wallace McMartin

WESTERN COAL CO.

POST OFFICE BOX 1026
ALBUQUERQUE, NEW MEXICO 87103

019

January 24, 1979

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets, NW
Washington, D.C. 20240

RE: Draft ES: Federal Coal Management Program

Dear Sirs:

Western Coal Co. supports the objectives in the Department's Preferred Alternative. We object, however, to the methods proposed to arrive at them. We hope the Preferred Alternative is adopted, with some variations which are proposed below, since it is unquestioned that renewed leasing begin, at least in New Mexico.

However, we trust the new leasing program will be freer of errors than this ES. A mining plan as full of mistakes as this would lead to the prompt dismissal of the person who prepared it.

In fact, although portions of this ES are very well done (e.g., the treatment of checkerboard lands and their associated problems, and the approach proposed toward land use planning), this appears to be not a leasing document, but rather a non-leasing document. This non-leasing bias is supported by erroneous data which imply impacts far greater than those which other Department documents have predicted.

One particular shortcoming of this ES, and one which was acknowledged by Mr. Bob Uram of the Department's Solicitor's Office in Albuquerque on January 3, is that the Preferred Program still leaves the opportunity for parties who would not be the developer of a tract for which there is only one logical market (e.g., a tract adjoining a power plant) to involve themselves in competitive bidding. This party, if their bid were the highest, instead of developing the property, could act as broker or middleman for the coal despite the most stringent diligence criteria, forcing the ultimate user - the consumer - to pay far more than the coal is actually worth.

A major deficiency is that leasing levels are proposed to be based on government projections of demand, rather than on the supply/demand mechanism of a free market. In your Preferred Program you are trying to draw a thin line, but you even admit that your projections may be faulty. I submit that this program, with its obvious strong points, will ultimately be far stronger and more equitable if it leases based on actual demand, with direct

participation and input from each state and the mining and utility industries, and not on projections of need. In fact, Table 5.2 points this fact out. In 1985, 5 of the 7 regions show industry needs to be greater than DoE targets. So, if these are correct, leasing to meet DoE targets will fail to meet industry needs. This obvious discrepancy must be addressed.

Western recommends that the Department include a timetable for the planning/tract identification/leasing/environmental assessment process, to include a guarantee for meeting this timetable. The proposed process appears awfully complicated and unwieldy, and the coal and utility industries would like some guarantee that this ambitious program will be carried out in a timely fashion.

Specific comments are listed below.

1. Figure 1-2. The boundary of the Star Lake-Bisti region is incorrect.

2. Table 1-5. Does not discuss how these federal laws have contributed to reduced and more costly production of federal coal. ES's are supposed to be objective, and objectivity demands that this be addressed.

3. Figure 2-1. This map is illegible. I suggest it be made into smaller maps.

4. Table 2-5. The Hospah KECRA is left out.

5. Para. 2.5.3. Fails to discuss regulatory delays as a factor reducing the growth rate of nuclear power.

6. Para. 2.5.5.6. The last sentence mentions "other developments." Which ones?

7. Table 2-23. How were these PRLA reserves estimated? How were "recoverable reserves without legal or environmental questions" determined? It would be useful to see the methodology in the Appendix.

8. Table 2-24. Total surface-mineable reserves in the San Juan Basin are approximately 6 billion tons, according to the New Mexico Bureau of Mines. Yet this table states that 4 billion tons alone are on Indian lands. This figure is very questionable, and should be checked both with the USGS Conservation Division in Farmington and with the New Mexico Bureau of Mines.

9. Table 2-25. The BLM's Proposed Action in the Star Lake-Bisti Regional EIS only projects 31 million tons as 1990's maximum production. Yet this table states that 32 million tons will be produced just from non-federal coal in 1990. The methodology for generating these numbers should be put in the Appendix so its adequacy can be determined. This figure of 32 million tons is but one example of choosing an exceptionally high figure to show that any leasing of federal coal is unnecessary.

10. Table 2-27. The figure of 2,560 acres is used here and in Para. 2.7.3 as the minimum acreage of nonfederal coal in a contiguous block that could be developed. On January 3 it was pointed out to Deputy Secretary of the Interior Freudenthal that this figure is much too small for New Mexico. The smallest proposed or permitted mine for steam coal in the San Juan Basin is 6,095 acres. Mr. Freudenthal stated that this figure of 2,560 acres was derived from Wyoming and Montana. This figure and the accompanying analysis must be revised, as Mr. Freudenthal assured us it would be.

11. Para. 2.8.1. The Draft ES states that federal leases issued before 1976 and not in production by 1986 will be cancelled. Asst. Sec. of Interior Guy Martin has written that leases would not be revoked if the failure to produce is due to regulatory delay. The analysis should reflect this.

12. Table 2-29. This table was made using data from BLM District Officer which has in many cases changed drastically, both in timing and tonnage. I suggest the Districts be contacted to provide more recent data. For example, in the San Juan River Region the 8.5 million ton figure given for 1985 production is more likely 1.2 million tons, and the total in column 3 is more likely to be 25.2 million tons.

13. Table 2-30. Column 4 gives a figure of 11.3 million tons. This figure was calculated using small PRLA's which the BLM's Albuquerque District acknowledges can't be developed individually, or mined at all without the development of adjacent coal. This figure must be revised downward considerably.

14. Para. 2.8.2. This paragraph does not acknowledge recent developments on the Navajo Reservation which appear to foreclose reasonable development opportunities.

15. Para. 2.8.2. This paragraph states that energy conservation could reduce demand. But DOE's Policy and Evaluation Division is examining ways to increase both metallurgical and steam coal exports as part of its FY-81 coal strategy. So, how do exports fit into regional demand estimates? This should be addressed.

16. Page 2-49. The top paragraph on the left appears to have been garbled in preparation or in printing. It is incomprehensible as written.

17. Page 2-49. The third paragraph is misleading. As the Star Lake-Bisti Regional ES states, not all of the coal-related employment would live in urban areas.

18. Para 2.8.3 This paragraph should acknowledge that it is presently illegal for the Secretary to make exchanges of existing leases, and that Congressional legislation is necessary to give him this

authority. This authority, by the way, is sorely needed, and should be addressed as a means of reaching the goals of the Preferred Alternative.

19. Para 2.8.4. This paragraph states that increased leasing may increase competition in the coal industry. But it does not state how stifling to competition have been the laws issued since 1970 and listed in Table 1-5. This lack of competition and its causes, by the way, has been acknowledged by the Justice Department's Anti-Trust Division. Again, an objective ES should discuss this.

20. Page 2-51. The second paragraph is also garbled and unclear.

21. Para. 3.1.1. I recommend 2 points to be added to this Preferred Program:

    a. Add an exchange authority to allow the Secretary to retain coal lands which may have other greater values.

    b. Allow selective noncompetitive leasing to assure cheap coal supplies for local markets.

22. Figure 3-5. I suggest the Department ackrowledge that this 5-point multiple-use planning process should have one additional step:

    (6) "Remaining area acceptable for future leasing activity may be economically unsuitable for mining due to its small size."

    Provisions should be made to allow a lessee to have input to the needed size and reserves of a tract.

23. Para. 4.8.2. It is true that the economy of the San Juan River Region is closely tied to energy. But, according to the Star Lake-Bisti Regional EIS, government accounts for the most employment, with 21.2% of regional employment and 24.3% of total income in 1977. This is completely at variance with the data given in Table 4-10.

24. Para 4.8.2. The Draft Programmatic states that regional population is "relatively" low; recreation is showing "significant" growth; land ownership is "primarily" federal; only "a small percentage" of land is private; in "many" communities lack of housing is "extreme." These are unquantified words, and should be quantified. Similar examples of this lack of quantification can be found throughout this Draft ES.

25. Para 4.8.2. This paragraph discusses water as a limit on development in the Region. But it fails to mention that by the mid-1980's over 40,000 acre feet of water may be available from the dewatering of deep uranium mines.

26. Para. 4.8.2. The paragraph also fails to mention the work force potentially available from a 5-county unemployment rate of 12.7% in 1977, as the Star Lake-Bisti Regional ES states.

27. Para. 5.1.2.1. This paragraph should acknowledge that other resource developments (e.g., uranium in northwest New Mexico) will make an increased base load energy demand by 1985 of more than 300 megawatts.

28. Table 5-6. No units of measurement are given.

29. Para. 5.2.2.3. This paragraph states that "surface mining operations would produce significantly greater geologic impacts than underground mining." However, USGS Open File Report 78-473 states that in the Western Powder River Basin, underground mining is more geologically damaging if proper surface mining reclamation procedures are followed. This Draft Programmatic should be consistent with other Department of Interior documents.

30. Table 5-12. 1990 figures are the same for the San Juan River Region and for the Uinta-Southwest Utah Region. One or the other is wrong.

31. Table 5-12. This Table also predicts water requirements for coal mining in the San Juan River Region as 62,500 acre feet at the middle range in 1990. However, the Star Lake-Bisti Regional EIS states that this demand will be only 14,488 acre feet in its high-level scenario. This discrepancy must be addressed, for, again, it implies impacts which other Department documents dispute as being too high.

32. Para. 5.2.3.2. This paragraph discusses post-mining habitat losses, but does not address habitat gains which are likely with successful reclamation. Again, a subtle hint that impacts will be greater than they actually will be.

33. Figure 5-3 shows no coal being moved by rail from the McKinley Mine to Texas or Arizona.

34. Para. 5.4.9 implies EMARS II was boycotted by all environmental groups. This was not the case and should be so stated. For the BLM's Chaco Planning Unit alone, two environmental groups made nominations.

35. Para. 7.2. The 85% recovery factor here conflicts with the 90% recovery factor given in Table C-11. These should agree.

36. Table 7-1. Production figures given again conflict with those in the Star Lake-Bisti Regional EIS.

37. Appendix A, Sample regulation 3472.1-1(c). Does this apply to subsidiary companies of railroads?

38. Figure C-5 shows 5 spoil rows between mining and reclamation. This conflicts with OSM Interim and Proposed Final Regulations.

39. Table C-1. The figure of 1,750 tons per acre-foot conflicts with the figure of 1,770 tons per acre-foot which must be used according to USGS General Coal Mining Order No. 1, dated July 3, 1978.

40. The following data were ackrowledged as erroneous by Mr. Uram, Mr. Van der Walker, and Mr. Moore on January 3, 1979 at the informal meeting in Albuquerque. These, too, must be corrected, since they imply a productivity from the San Juan Basin that simply is far from accurate.

    a. Table D-1, page D-3. The Figure of 11.04 acres/animal unit/year is acknowledged by the BLM's Albuquerque District as inaccurate. The figure given by the BLM for the Star Lake-Bisti Region is 12.52 acres/animal unit/month. The figure given in the Programmatic should be revised.

    b. For sagebrush steppe the Programmatic gives a figure of 1.8 tons of productivity per acre. The BLM's Albuquerque District was unable to provide an accurate figure, but estimated that 1,000 pounds per acre would be excessive.

    c. For Grasslands the Programmatic gives a productivity of 4.5 tons per acre in the San Juan Basin. A 1974 figure for intensive hay production in Illinois (FES Related to the Proposed Braidwood Station, done by Commonwealth Edison and accepted by AEC) predicts only 2.92 tons of productivity per acre. To suggest that the San Juan Basin is 2X as productive as the heartland of mid-America is ludicrous.

    d. Table D-1 also gives productivity figures for corn, hay, wheat, cotton, and sugarbeets. None of these crops are presently grown on any potential coal lands in the San Juan Basin. The current use and likely end use of these lands is grazing. Moreover, cotton is grown in New Mexico no farther north than Socorro, 60 miles south of Albuquerque.

41. Table F-1 says 27,400 people, or 16% of the population of northwest New Mexico is coal-related population. The BLM's Star Lake-Bisti Regional EIS states that only 3,475 people were coal-related in 1977, and this includes basic and non-basic and indirect employment plus families. This discrepancy must be addressed, since carried further in later tables it suggests that coal-related socio-economic impacts will be far greater than they actually will.

42. Tables F-2 and F-3 show the same great discrepancy discussed in item No. 41 above.

43. Table G-2 differs enormously from approximately similar tables in the Star Lake-Bisti Regional EIS. For example, even the 1985 low level coal-related population given in the Programmatic is more than 80% greater than the equivalent figure given in the Regional EIS. These discrepancies must be addressed.

44. Table I-1 shows reclamation costs to be $2,900/acre. Our experience at our San Juan Mine shows such costs to average approximately $5,200/acre. I suggest this table be revised through contacting the surface mine operators in the San Juan Basin.

45. Table I-1. The heading on the right-hand column is wrong. It should not be "Total $/acre."

46. Table I-3 gives an average dollar cost/ton of coal mined as 9¢ for reclamation. Our experience suggests this figure is 26¢ - 30¢ per ton. This table can also be easily revised through contacting the surface mine operators in the San Juan Basin.

Western Coal Co. supports the objectives in the Department's Preferred Alternative. Western hopes this Preferred Alternative is adopted with the amendments we have suggested. But we hope the new leasing program is not as full of flaws as this document clearly is.

Sincerely,

George C. Byers

George C. Byers
Environmental and Regulatory Coordinator

GCB/jad

cc: Mr. Jack Kennedy
Director, Minerals Division
State Land Office
PO Box 1148
Santa Fe, NM 87501

Eastman Orchard
Hotchkiss, Colo. 81419
Phone 872-3547

January 24, 1979

Mr. Steve Quarrels, Director
Office of Coal Leasing Planning and Coordination
United States Department of the Interior
Washington, D.C. 20423

032

Dear Mr. Quarrels:

As a resident and apple grower in Hotchkiss, located in the North Fork of the Gunnison River Valley, I have grave concerns for the future of the agricultural industry in Delta County. The magnitude of coal developments projected is far more than this small area can accomodate and still maintain any semblance of its beauty and agricultural productivity. The projected AdCO Mt. Gunnison mine alone will throw the county into a $6,000,000 deficit annually. (Please see Vol. I, Chapter 4, page 24. (chart following that page) of the West Central EIS.) Other frightening adverse results are listed at great length in the same West Central EIS Vols. I and II.

In the Draft ES for the Western Coal Leasing Programatic is a paragraph on page 3-21 which addresses Thresholds - ecological and socio-economic. How can a person or a governmental entity go about requesting a socio-economic threshold study for the North Fork? If resources other than coal are to be preserved, such a study appears to be imperative.

The citizens of the North Fork have not asked for actions to stop coal development. They feel the coal should be mined if the country needs it, and they are also well aware of the jobs coal mining provides. What they desire is phased development over many many years. Such a plan would allow agriculture and recreation to continue, and coal to be mined for future generations as well as for present generations.

Any help you can provide us on the requirements to request an economic-social threshold study would be greatly appreciated.

Sincerely yours,

Edwina Eastman
Rt. 2
Hotchkiss, Colorado 81419

High Country Citizens Alliance

P.O. Box 1066 Crested Butte, Colorado 81224

February 1, 1979

042

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets NW
Washington, D.C. 20240

COMMENTS FOR THE RECORD CONCERNING THE DRAFT ENVIRONMENTAL STATEMENT ON THE FEDERAL COAL MANAGEMENT PROGRAM DATED DECEMBER 1978, PREPARED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT.

In reviewing the DES for the Federal Coal Management Program we have been impressed by the thorough and conscientious manner in which the requirements of applicable Federal laws have been incorporated in the proposed management program. Both the DES document and the management approach could well serve as models for others. We commend the Department of the Interior for a major step toward management of the public lands for the greater public good.

While the technical aspects of administration and documentation are superior, we are concerned that the full potential of the proposed program may not be achieved because of questionable assumptions, biases, and weaknesses which must inevitably affect implementation. In essence, we feel that excellent tools will be applied to incomplete purposes. In the following paragraphs we outline our concerns and suggest corrective revisions to the Preferred Program.

Our first three concerns arise from the fear that past excessive leasing and its various costs will be perpetuated under the Preferred Program (though perhaps to a lesser degree) despite the professed intent to exercise good management. We suggest that this deficiency in the Preferred Program can be corrected by three modifications: use of measures of real market demand rather than DOE production targets as a basis for lease offerings, continuation of the moratorium on competitive leasing through 1985, and progressive tightening of due diligence requirements to minimize the ratio of leased reserves to annual production.

Our first concern is that DOE production targets (which have little direct relation to economic need) are translated to forecasts and interpreted as demands which must be satisfied by production from old and new leases. Another way to describe this kind of "management" is to say that if leases are sold to

meet DOE goals, then coal will be produced irrespective of market demand. This is neither good logic nor good economics and can easily lead to excessive leasing. The experience prior to 1970 is proof that more leases do not necessarily lead to more production. If increased coal consumption is desired, then DOE must stimulate demand which in turn would call forth greater production; but attempting to stimulate demand by increasing supply is putting the cart before the horse -- there is just not that much leverage through price elasticity at the leasing level. The Department of Interior is obliged to be ready to support DOE goals, and planning must include at least this potential, but the actual offering of leases should be triggered by realistic measures of market demand -- not wishful thinking. A strong policy statement to this effect is needed.

Our second concern is with the large backlog of existing leases and PRLAs and with the costs associated with excessive leasing (section 2.8.1). The DES takes the position that this problem will vanish spontaneously in 1986, and in the meantime an aggressive leasing program can be initiated. We feel that it is poor policy to increase significantly the number of excess leases, even in the short term. We conclude from the DES that careful management of existing leases, PRLAs, emergency leases, and exchanges through 1985 (while continuing the current moratorium on new competitive leasing) would pose little risk to meeting national needs in either 1985 or 1990. The DES seems to assume that cancellation of leases in 1986 will create an abrupt discontinuity in production potential that can only be avoided by new leasing prior to that time. The fallacy in this position is that production estimates are based on current intentions, leading naturally to a shortfall in the longer term. What will actually happen over the years as the planning horizon recedes is that lease holders will re-evaluate their future markets and modify their plans accordingly. Thus real market needs will be satisfied through 1990 and beyond. A great advantage to continuing the present moratorium on competitive leasing is that the Land Use Planning and Management aspects of the Preferred Program (see figure 3-10) can be established prior to diverting resources to extensive new leasing, thus providing for a smoother start up. The only disadvantage of this modification to the Preferred Program is that new operators could not enter the Federal coal lease arena, but this should not have a significant affect on competition in the coal business over the few years involved. New competitive leasing should only be resumed in conjunction with large scale cancellation of existing idle leases.

Our third concern is with the criteria for due diligence which are now inadequate to their intended purpose of keeping Federal resource management in the hands of Federal land managers. At issue is the ratio of the amount of coal reserves in outstanding leases to the amount of coal produced annually. This ratio is, in effect, the number of years of Federal coal production under private control; or, viewed in another way, it is a built in time delay limiting the implementation of new Federal policies. Taking leased reserve figures from Tables 2-22 and 2-23 and annual production figures from Tables 2-20 and 2-21, we get a ratio of 74 (years). This high figure can be a serious impediment to resource management. Following lease cancellations in 1986 the ratio will drop to about 30 (reflecting the 30 year mine life assumption used throughout the DES). Assuming that after 1986 a regular leasing program is matched to market demands, and if the current 40 year mine out requirement is maintained, then the ratio of leased reserves to annual production

could gradually drop toward 20. This is the lowest possible figure under current rules. By comparison, the petroleum industry for many years maintained (by choice) a reserve/production ratio of about 10 in order to best balance market risks from both the demand and investment aspects. The coal industry has historically maintained a higher reserve/production ratio, and past Federal leasing practices allowed companies to lock up vast reserves, thereby essentially eliminating this aspect of risk. This is a kind of Federal subsidy which has no justification! The costs of leasing too much coal are vividly described in section 2.8.1. The leased reserve/annual production ratio allows quantification of "too much" and should be recognized explicitly as a management factor at all levels -- local, regional, and national. Furthermore, this ratio should, as a matter of policy be reduced to the lowest possible value consistent with economic development of coal resources. Ideally, coal should be leased in response to need, and production should be brought to a stable level and maintained for the life of the mine. To this end we suggest that negotiations be initiated with DOE to revise due diligence requirements as follows: the current 40 year mine-out should be reduced to 35 years with provision for future 5 year reductions as experience with planning horizons indicates (the goal being to gradually reduce the leased reserve/annual production ratio); for new mines and major expansion of existing mines, the current provision for review of mine development plans within 3 years should be expanded to require full production at 10 years with immediate cancellation of that portion of the lease that could not be mined at the then prevailing production rate within the mine-out period (the goals being to discourage speculation and to stabilize coal production and the local economy); for old mines a review of each LMU should occur at 10 year intervals with production over the preceeding 10 years used to project future production and with immediate cancellation of that portion of leases within the LMU which would not be expected to be mined within their mine-out times (the goals being to stabilize production growth rates and to leave Federal resource managers in control of major changes); and the present requirements for 1% of production at 10 years and a minimum of 1% per year thereafter should be replaced by a requirement to maintain at least 2% of production annually once production begins (the goals being to reduce economic and environmental impacts of token development undertaken principally for the purpose of maintaining the lease while minimizing impacts of start and stop operation). In short, the policy on leases should be use it or lose it.

Our remaining concerns arise from the fear that other potential benefits of public land use (both commodities and amenities) may receive inadequate consideration because of over emphasis on coal production. We suggest that this deficiency can be corrected by deferring decision on suitability of controversial tracts, by greater coordination with other agencies, by stronger insistence on impact mitigation, by uniform requirements for all operators, and by refinement of recommended Lands Unsuitability Criteria, management guidelines, and regulation.

Our fourth concern is that the Lands Unsuitability Criteria, with their exceptions, leave so much discretion in the hands of local land managers that both abuses and non-uniform application are inevitable -- leading almost certainly to additional litigation. Furthermore, the recommended LUCs are deficient in the areas of socio-economic impacts and reclamation potential. The concept of the LUC is excellent, but both the criteria and their implementation need further refinement.

In the area of implementation, we feel two changes are necessary: the simplistic choice between suitable and unsuitable needs to be expanded to include a deferred category for which there is sufficient controversy to warrant further study (the goal being to make suitable tracts available for leasing as soon as possible while deferring more detailed examination of controversial tracts until needed or until management resources permit); coordination with and concurrence of other parties having land management responsibilities must be made mandatory, to include Federal and state agencies, local governmental entities, and surface owners as applicable (the goals being to insure consideration of competing beneficial land uses and to identify controversial tracts).

Our fifth concern is that management program goals will not be achieved because of inadequate enforcement. The heart of the new management approach is mitigation of social, economic, and environmental impacts in one way or another. As we read current laws, if impacts cannot be mitigated adequately, then mining shall not occur. Land managers will attempt to screen tracts prior to offering leases for bid, but ultimate responsibility for mitigation must lie with the purchaser. To enforce this responsibility we feel two new requirements are needed: the mine development plan submitted by the lease holder should include proposed measures to mitigate all anticipated social, economic, and environmental impacts (to include arranging for front money where necessary) with documentary evidence sufficient to support the reasonable conclusion that the proposed measures would be successful, and the prior record of a bidder or lease holder should be admissable for consideration by the land manager in deciding such matters as whether to accept or reject a bid, whether to approve a development plan, or whether to require the posting of a bond.

Our sixth concern is that the management program is seriously weakened by exempting certain governmental entities from full compliance. We feel that all coal mining should be conducted under the same rules irrespective of who does the mining.

Our seventh and final concern is that a potentially outstanding management program will be critically compromised by undue haste in implementation. Some compromise may already have occurred through premature use of recommended LUCs in current land use planning; additional compromise may occur in the near future if regulations are adopted without adequate public input and without adequate consideration of competing resource management plans, and a fatal compromise will occur if new competitive leasing is initiated before prior steps in the management program are brought into full compliance with new procedures and policies. Considerable work remains to be done in refining such areas as LUCs, management guidelines, exemption policies and enforcement policies and in incorporating these matters into regulations. We feel that these remaining efforts should be conducted with the same care that so evidently preceeded publication of the DES. Since the DES fails to support the urgent need for new competitive leasing prior to 1986, we feel that the current moratorium should be continued at least until the other aspects of the new management program are fully implemented.

In summary, the generally superior quality of both the DES and the Preferred Management Program is compromised by weaknesses which are likely to lead to mismanagement through both excessive coal leasing and inadequate consideration of

competing land uses. We have proposed corrective revisions to the Preferred Program which, though seemingly minor in the context of the total planning and management effort, are nevertheless critical to its success. Our most important conclusion is that the Preferred Program should be modified to continue the current moratorium on competitive leases through 1985, thereby allowing Department resources to be concentrated on refinement and implementation of other Program aspects which must of necessity precede resumption of leasing.

Sincerely,

Dick Wingerson
Chairman, Technical Committee

Chuck Malick
President

DW/kf

cc: Guy Martin
Brad Klafehn
Kirk Cunningham
Mark Welsh

OFFICE OF THE GOVERNOR
STATE A-95 CLEARINGHOUSE

STATE PLANNING OFFICE
AREA CODE 802-828-3326

STATE OF VERMONT
MONTPELIER, VERMONT 05602

047

MEMORANDUM

To: Office of Coal Management (140)
Bureau of Land Management
18th and C Streets, N.W.
Washington, D. C. 20240

From: John E. Holmberg, State A-95 Coordinator

Date: February 5, 1979

Subject: Draft Environmental Statement, Federal Coal Management Program

As the State Clearinghouse under OMB Circular A-95 we have notified other public agencies with a possible interest in your: Draft Environmental Statement.

Copies of comments received are attached, from the State of Vermont Energy Office.

JEH:en
encl.

VERMONT STATE ENERGY OFFICE
PAVILION OFFICE BUILDING
MONTPELIER, VERMONT 05602
Tel. 802 828-2768

MEMORANDUM

TO: John E. Holmberg, State A-95 Coordinator

FROM: Vermont State Energy Office

DATE: February 5, 1979

SUBJECT: Draft Environmental Statement - "Federal Coal Management Program"

In 1975, 0.7% of the fuel consumed in Vermont was provided by coal.

The poor condition of Vermont's railroads is a factor which operates against a near term, increased use of coal in Vermont. The enormous expense required to rehabilitate old lines and lay new track in order to provide an adequate delivery system will continue to be a barrier for the forseeable future.

The above and the fact that Vermonters are, to an increasing degree, turning to wood, a native "alternative" fuel resource, for heating their homes and producing electricity, provide the basis for the general nature of my remarks to follow.

Since this review is a response to a draft environmental statement I will not comment on the wisdom of increased reliance on coal as an interim step in an overall national energy strategy.

The Vermont State Energy Office feels that every energy resource should be given serious consideration with an in-depth analysis of its potential impact on every facet of society and the natural environment.

The pilot coal liquefaction project presently funded by the D.O.E. is of interest to Vermont. A recent National Academy of Science report indicates that by 1990 3.5 million gallons of oil could be produced from coal if the present experiments prove successful. This 15% of the anticipated demand for oil in that year would be

FEB 05 1979

bought for an investment in facilities of 100 billion dollars and an annual consumption of 370 million tons of coal above the 1.2 billion tons the Administration hopes will be used in 1990.

The figures quoted by the Academy indicate that the 600 million dollars for this program would be better spent on a less environmentally harmful energy resource.

The feasibility of attaining the goals for coal production set by the National Energy Plan was evaluated by the General Accounting Office in their report "An Evaluation of the National Energy Plan" issued in July of 1978. I refer the reader to that report.

In the report the GAO also expressed pessimism about the possibility of greatly increased coal production while maintaining environmental standards.

I also refer the reader to "The Health and Environmental Effects of Increased Coal Utilization", a report issued by the National Institutes of Health in 1977 and commonly known as the Rall Report after David Rall, director of the National Institute of Environmental Health Sciences.

This draft environment statement determines that by the year 1990 solar energy will not contribute more than one or two percent of the total water and space heating requirements of the U.S. In a crisis determined to be the moral equivalent of war this nation would be wise to devote its available resources to the rapid development of this relatively benign energy source rather than pursuing programs where the environmental tradeoffs for the net energy gain are unacceptable.

February 7, 1979

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

053

Re: Comments Concerning U.S. Department of the Interior Draft Environmental Statement Federal Coal Management Program

Dear Sirs:

I. GENERAL REMARKS

There can be but one alternative to a federal coal leasing program. That one alternative is no federal coal leasing program. The alternative of no federal coal leasing program is simply not available to the U.S. Department of the Interior for two reasons:

(A) Interior is charged with the statutory responsibility of managing the coal resources owned by the federal government, and
(B) The federal coal resources are so massive it would be gross mismanagement not to have a program.

The National Environmental Protection Act (NEPA) applies to federal programs, as well as federal actions. Therefore, whatever program Interior decides upon, Interior must prepare an Environmental Statement (ES) on its program.

In carrying out its statutory responsibility of preparing a program for federal coal leasing, it is totally irrelevant to address "the need for leasing" as a prerequisite for a program. At such time as Interior proposes to actually lease federal coal under its program the question of the "need to lease" might be raised. However, if the question of the "need to lease" is raised at that time the question can only be considered in response to a complaint alleging that Interior, in offering leases, is acting "arbitrarily and capriciously" because there is "no need to lease". In that situation, the burden of proof would be on the plaintiffs to show that Interior is acting arbitrarily and capriciously in proposing to actually lease federal coal, a most difficult burden for the plaintiffs given the weight which the courts quite properly ascribe to the expertise of agencies acting within the areas of their assigned responsibilities. Also, the plaintiffs, not Interior, would have the burden of proof to show there is "no need".

The "need for leasing" is not a proper matter to consider in the ES on Interior's Program. Judge Pratt to the contrary notwithstanding, under no circumstances can the "need for leasing" be considered a prerequisite for a federal coal leasing program. Interior's program should be a program which is valid and appropriate under present laws applicable thereto covering leasing of federal coal whenever Interior decides to lease and regardless of the frequency or volume of leasing.

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II. NRDC vs. HUGHES

Under the U.S. Constitution and the Separation of Powers Doctrine, it is improper and inappropriate, if not unconstitutional, for the Executive Branch (Department of the Interior) to permit the Judicial Branch (Judge Pratt) to require the Executive Branch to address the question of the "need for leasing".

(a) The Executive Branch, by a number of Acts of the Legislative Branch, has been granted both the authority and the responsibility to manage the lands and mineral resources owned by the United States of America.

(b) Leasing of federal coal is the statutory responsibility of Interior. The determination of the need to lease is both a statutory and proper responsibility of Interior as the agency designated to manage coal owned by the United States.

(c) The determination of the need to lease, when, and in what quantities, are determinations that cannot constitutionally be delegated to the Judicial Branch. Nor can the Executive Branch properly submit even to inquiry by the Judicial Branch as to the determination of "need", let alone feel it necessary to justify such determination to a federal judge as a prerequisite to preparing a leasing program.

(d) Judge Pratt acted improperly, if not unconstitutionally, in requiring Interior to demonstrate to him the "need for further leasing". Interior acted improperly, if not unconstitutionally, in recognizing any authority on the part of the Judicial Branch (Judge Pratt) to require a showing of "need".

If an administrative agency, in carrying out its statutory responsibilities, acts "arbitrarily and capriciously" that is one thing. When that is alleged, the burden rests on the plaintiff to show by convincing evidence that such is the case. That was not the issue in NRDC vs. Hughes.

In short, it is no business of the Judicial Branch to inquire into, let alone sit in judgment on, the "need for leasing". The authority, the responsibility, and the duty to determine the "need for leasing" reposes upon the Executive Branch alone. So long as the Executive Branch, in making its determinations, does not act arbitrarily and capriciously it is simply no business of the Judicial Branch.

How the Executive Branch exercises its management authority and discharges its management responsibilities is, of course, another matter.

III. NEED FOR LEASING

Unless the federal government (by accident or design) nationalizes the coal industry, the federal government cannot (nor can anyone else) competently quantify the "need for leasing".

National averages and national trends can be programmed; low, medium, and high national forecasts and projections can be made. However, coal (at present) is still mined by independent producers (large and small) making independent decisions to do so. And coal (at present) is still purchased

by users (large and small) making independent decisions to do so. Some producers and some users may have no alternative except produce coal or go out of business, or use coal or go out of business. Other producers or users may have several alternatives.

The decisions individual businesses make are usually based on economic considerations known at the time the decisions must be made and are largely unpredictable much in advance of the time when the needs are known and the plans of the individual business dictate a decision be made. (For example: Will there be coal slurry pipelines someday? When? To "where" and from "where"? The "from where" has much to do with the quality of the coal. The "to where" could significantly affect the "delivered price" by offering a significant alternative to the rapidly escalating rail rates. Will there be technological "break-throughs" favorably affecting the economics of what today's conventional wisdom says are the economic parameters for studies, forecasts, and projections, or the viable choices available to the market place when the individual producer/user decisions are made by them tomorrow?)

Coal is not mined by individual producers because some national forecast says the nation's coal industry will produce a certain tonnage nationally. Coal is not purchased by individual users because some national forecast says the nation's coal users will use a certain tonnage nationally. On the contrary, unless the federal government contemplates nationalizing the coal industry (and the industries that use coal), coal will be mined only when and where it can be mined and marketed by individual producers at a profit commensurate with the risk capital employed. It will be mined in the quantities individual producers are willing to gamble on as to a production rate, based on their individual estimates of their ability to market that production at a profit.

Similarly, coal will be purchased by users only when individual users determine they need BTU's, and they decide the quantities they need and they decide that coal is their preference as the source for the needed BTU's. Thus, a sale of coal to one user by one producer may preclude, or reduce, production (or planned production) by another producer, or increase such other producer's "risk" in going ahead with a mine or an expansion of an existing mine.

There are many laws, rules and regulations impacting the individual business decisions to be made by coal producers. No computer model or program can predict in a meaningful way the many decisions the market place will make which still determines whether specific producers will go in to the coal business, or open new mines, or shut down or expand existing mines. (For example: OSM has recently reported that strict and immediate enforcement by OSM of just one of the new regulations dealing with non-conforming structures will result in the loss of annual production of 107 million tons of coal.)

There are many laws, rules and regulations impacting business decisions to be made by coal users and potential coal users. No computer model or program can predict in a meaningful way the many decisions the market place will make which still determines whether specific users will use coal at all, or discontinue or expand their use of coal. (For example: new plant locations, and expansions of existing plants, are highly dependent upon

EPA/State air regulations. Where, when and how large will future Class I Areas be? What areas will become the "non-attainment" areas tomorrow or ten or twenty years from now? The plans of users and potential users has already been significantly affected by the changes which the Clean Air Act Amendments of 1977 made in the Clean Air Act of 1970.)

In NRDC vs. HUGHES, both the plaintiffs and Judge Pratt made much of the so-called "fact" that there is presently some 16 billion tons of "recoverable" coal under lease. Reference was also made by the plaintiffs and Judge Pratt to an additional 9 billion tons of "recoverable" coal involved in the nearly 200 applications pending for Preference Right Leases.

Whatever validity such estimates may have, that validity rests upon technological and economic assessments. ("Technology", meaning can the coal be recovered with present technology. "Economic", meaning can the coal be produced and sold at a profit.) Today, technological and economic assessments have little to do with determining recoverable reserves. To be sure, coal must still be recoverable with present technology and mined and sold at a profit to be considered for the classification of recoverable reserves. But, today, two additional questions must be answered:

(1) Is the leased coal legally available to mine?

(2) Is the leased coal that is legally available to mine legally mineable?

As any knowledgable coal producer today recognizes, all estimates of "recoverable" coal reserves based only on technological and economic assessments, no matter how good, are irrelevant, incompetent and immaterial estimates of actual recoverable reserves. No one, today, can possibly state (quantify) the nation's coal reserves recoverable under existing leases not yet in production. It is even more preposterous to state what coal reserves are recoverable under pending Preference Right Lease Applications because no one in or out of government knows what PRLA's will even be finally issued.

As to existing leases not yet in production, no holder of such a lease knows whether he will be legally able to mine the coal leased to him until he has all of the local, state and federal permits in hand. Competent mining engineers can, of course, determine the coal reserves covered by the lease which can be recovered with present technology. Reasonably reliable estimates can even be made as to the coal reserves that may be economically recoverable. But, no coal is recoverable today until it is known that the coal is legally available to mine and legally mineable and that can not be known until all required permits are in hand as an accomplished fact. Then, and only then, can recoverable reserves be determined today.

No one, in or out of government, has applied all of the local, state and federal laws, rules and regulations involved in determining whether coal can legally be mined to each of the presently existing federal coal leases not yet in production. Even if it were possible to do this (which it is not), and even if this had been done, no one in or out of government can provide assurance that no member of the public will challenge the conclusions reached as to each existing federal coal lease not yet in production thus "found" to meet all of the local, state and federal laws, rules and regu-

lations making such coal legally available to mine and legally mineable.

Of the approximately 520 presently existing federal coal leases located west of the Mississippi River, 491 of these existing leases (about 95% of the total), covering over 715,000 acres of the total of about 788,000 acres presently under lease, are leases issued before 1970. Thus, about 95% of the existing leases, covering about 90% of the total acreage under lease, must comply with all of the local, state and federal laws, rules and regulations which have become effective since those leases were issued if the coal presently under lease is to be mined.

As a matter of fact, over 400,000 acres of federal coal lands were leased in the years 1965 through 1969 (a five year period). This represents more than 50% of the total federal acreage under lease. Since 5 to 7 years, at a minimum would be required to get from the "lease issuance stage" to the "production stage", few of these leases could have become mines before the enactment of all the laws, rules and regulations with which leases must now comply for the leased coal to be mined.

Certainly the lessees who acquired leases prior to 1970 did not select the lands leased to them based on any knowledge that those leased lands would meet all of the requirements of all of the local, state and federal laws, rules and regulations subsequently enacted in order to be able to legally mine the coal they have under lease.

IV. LEASING

Interior's Program must comply with a number of laws enacted by the Legislative Branch. Interior's Program for leasing falls within the purview of NEPA and requires a "legally adequate" ES. The Program and the required ES do not depend upon justifying the "need to lease". Furthermore, leasing itself is no longer, if it ever was, a "major federal action significantly affecting the human environment".

Prior to 1970, the issuance of a federal coal lease granted to the lessee the legal right to mine the leased coal. The lessee had the legal right to mine the leased coal regardless of whether there was split ownership of surface and minerals. (The lessee, of course, was obligated to pay for any damages caused by the lessee's mining operations.)

The issuance of a lease today is of no more environmental significance than publishing the Federal Register or transmitting a piece of paper. It is preposterous to assert that the issuance of a lease today has any effect whatsoever on the human environment. The reason is very simple: Today, the lessee of federal coal (under existing leases as well as under new leases that may someday be issued) has absolutely no legal right to mine federal coal leased to him by reason of holding a lease to that coal. Today, the federal lessee has only the exclusive right to try and obtain a legal right to mine the leased coal. The lessee must obtain the legal right to mine the coal leased to him within a specified period of time or he will lose the lease. No guarantees come with the lease that the lessee will be successful in obtaining the legal right to mine the leased coal. The federal government makes no representations or warranties that the federal coal leased to the lessee is legally available to mine or, if legally available to mine,

that the leased coal is legally mineable. No refunds are given the lessee if he is unsuccessful in obtaining the legal right to mine the coal leased exclusively to him.

With respect to leasing, the facts of life today are:

(A) Upon issuance of a federal coal lease, the lessee will necessarily have to do far more drilling than was done by the federal government prior to leasing. Such drilling is necessary to prepare a mine feasibility study including the development of a competent mine plan and reclamation plan. Before the lessee can drill on his lease, he will have to prepare a drilling program and obtain the approval of the U.S. Geological Survey (USGS) for the drilling program. USGS, prior to approving the lessee's drilling program, will request an Environmental Appraisal Report (EAR) from the Bureau of Land Management (BLM). BLM will undertake an EAR whether or not the surface involved is owned by the federal government. (In fact, BLM will prepare an EAR even if the surface is entirely owned by the lessee.) Assuming BLM finds no endangered species, such as the "loco weed", in the drilling program area, and assuming all other laws, rules and regulations constraining drilling activities are satisfied, drilling can then proceed.

(B) Such drilling may or may not disclose a coal deposit forming a Logical Mining Unit. (The "theory" is that Interior will lease Logical Mining Units. However, Interior does not guarantee that to be the case and Interior will not be doing the mining nor will Interior have any capital at risk.) If the lease is not an LMU, that may end the matter since certain immutable economic laws still govern whether or not a lessee can risk his capital to develop a mine.

(C) Even assuming the lease is an LMU, until a mining feasibility study is completed, based on competent drilling data and extensive coal quality analyses, the lessee does not know what his costs will be in mining the coal. This information is necessary in order to have some realistic idea of what the coal must sell for to justify risking the capital investment in developing a mine. A realistic idea of mining costs and required selling price, as well as reliable data on coal quality, are essential in determining the prospects for marketing the coal if it is produced. Of course, other potential coal suppliers may exist for the same market the lessee is seeking to serve. If the lessee finds, as well he might, that the price he must get for his coal (to justify the risk of investing his capital in opening a mine) is not competitive with other producers, his hoped for market may disappear -- and with it the lessee's plans to mine the coal leased to him.

(D) Assuming the lessee's proposed mine is not ruled out by the economics of the market place, the lessee then has the exclusive right to start down the long, long road of trying to obtain the legal right to mine the coal leased to him. This means the approval of a special use permit from the county where the lease is located. It also means getting the approval of various state agencies having

jurisdiction. But, ignoring county and state considerations and confining this discussion only to federal laws, rules and regulations, the lessee of federal coal (whether it be an existing lease or a new lease awarded sometime in the future) must convincingly demonstrate (and frequently defend in court against a citizen suit) that the lessee's mine plan and reclamation plan comply with at least all of the following federal laws:

- The National Environmental Policy Act
- The Clean Air Act of 1970
- The Clean Air Act Amendments of 1977
- The Clean Water Act
- The Clean Water Act Amendments
- The Coal Leasing Act Amendments of 1976
- The Surface Mining Control and Reclamation Act of 1977
- The Safe Water Drinking Act of 1974
- The Historic Preservation Act
- The Solid Waste Disposal Act
- The Toxic Substance Control Act
- The Water Pollution Control Act
- The Water Pollution Control Act Amendments of 1972
- The Resource Conservation and Recovery Act
- The Mine Safety and Health Act of 1969
- The Mine Safety and Health Act Amendments of 1977
- The Federal Land Policy Management Act of 1977

(E) There are, of course, a number of other federal laws (and state laws on similar subjects), and the federal agencies which administer these laws have regulations. There are many rules and regulations of federal agencies such as the Bureau of Land Management (BLM), the U.S. Geological Survey (USGS), the President's Council on Environmental Quality (CEQ), the Environmental Protection Agency (EPA), the Mine Safety and Health Administration (MSHA), the Corps of Engineers (CE), the U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service (USFS), the Occupational Safety and Health Administration (OSHA), and, most recently, the Office of Surface Mining (OSM). These agencies are issuing new rules and regulations, and revising rules and regulations frequently. In determining whether coal is legally available to mine and legally mineable, matters of such critical importance as "prime agricultural land" and "alluvial valley floors" are still unresolved. Then there are, and will be, administrative interpretations of rules and regulations and, no doubt, judicial decisions regarding administrative interpretations.

By reason of the foregoing, it can be stated categorically that no one, today, can know whether they will be able to mine coal from a federal lease until after they have gone down the long, long road above described and have in hand all the local, state and federal permits required to be able to legally mine coal. There can not possibly be a significant impact on the human environment from a coal mine until there is, in fact, coal that is legally available to mine and legally mineable. That can not be known by the federal government, or by a lessee of federal coal, until the lessee has in hand all of the required permits. In the process of obtaining all the required permits,

a legally adequate "site-specific" environmental impact statement must be prepared before the proposed mine plan will be approved. Therefore, it is the approval by the federal government of the mine plan, not the issuance of a lease, that is today the "major federal action significantly affecting the human environment".

V. THE PROGRAM

While the only alternative to a Program is no Program, the Program itself, as the Draft ES indicates, can have a number of variations and alternatives.

The following comments relate to the four areas of the Program which I feel are of greatest concern.

A. MAXIMUM ECONOMIC RECOVERY

On Page 3-32 of the Draft ES, the question posed is

> How should the Department define and apply the phrase "Maximum Economic Recovery" (MER)?

The Secretary's Preference is stated to be:

> "Calculate maximum economic recovery on basis of all seams in land (all seams which collectively are profitable must be mined) with consideration for social and environmental costs".

As any competent mining engineer knows, a mine plan is an ongoing process. As new data becomes available, as the operator gains actual experience operating the mine, new ideas develop, new problems are encountered, new opportunities are presented. Given the very limited amount of drilling data that will be available to the Department prior to leasing, how can it be considered even remotely possible for the Department to determine "all seams which collectively are profitable to mine". To make such a determination requires knowing (not guessing) mining costs, seam thicknesses for the entire ore body, all quality data for all seams, the extent of oxidation, the extent of burn areas, the ability to design a mine to possibly mine both surface and underground seams, the market for the coal, the production rate of the mine, and a host of other matters prerequisite to being able to justify the capital investment in a mine.

Interior will not mine the coal. Interior will not have capital at risk. Certainly Interior will not represent and warrant the seams which collectively are profitable to mine. Interior will not underwrite the costs of mining should they turn out to be greater than Interior determined in arriving at its decision concerning mining costs. Nor will Interior underwrite the selling price if it turns out the coal cannot be sold at the price Interior determined in arriving at its decision concerning profitability.

I am not suggesting that Interior should make such representations and warranties, and underwrite any errors in its determination of profitability. I am simply trying to point out the utter folly of presuming that the elements

involved in what Interior is trying to do can be known prior to leasing. In fact, the elements involved cannot be known even by the lessee until he has prepared a competent mining feasibility study and carried out a realistic market study and then, if both studies are favorable, convinced the Board of Directors of his company that the proposed mine offers a reasonable chance of deriving a satisfactory rate of return to justify risking the capital needed to develop a mine.

B. FAIR MARKET VALUE

What is "fair market value"? With respect to Lease Sales, it is stated in Section 3.1.1.3 on page 3-5 that:

> "Each tract selected by the Secretary for lease sale would be analyzed to determine the appropriate fair market value and its maximum economic recovery."

Further on in that Section the Draft ES says: "In no case would bids for less than fair market value be accepted". It is also stated that "comments on the fair market value and maximum economic recovery would be taken before the sale".

One starts with the basic premise that coal which cannot be mined and sold at a profit has no market value at all. Next, one can presume that no one will bid for a lease who does not have some reason to think that, if successful in bidding in the lease, one will be able to produce and sell the coal at a profit. However, the lessee will not commit capital to the development of a mine until he is reasonably confident he can produce and sell the coal at a profit. The level of confidence needed to put capital at risk is not acquired with the acquisition of the lease. Based on Interior's policies during the past few years, one would conclude that Interior feels it can determine the mining cost and production rate of the proposed mining operation, and determine the selling price of the coal to be mined. With that information in hand, Interior then calculates the "profitability" of the proposed operation, determines what Interior thinks is a fair rate of return for the operator, calculates "present value" and sets the minimum bonus acceptable and the production royalty. How these determinations can be made at all prior to leasing is a mystery to me -- as I'm sure it is to any other engineer in the business of actually producing coal. That any one can possibly think these determinations can be made with the limited drilling data Interior will have available is completely confounding.

Being realistic, I recommend no minimum bonus or, if there must be a "number", set a number (unrelated to "fair market value") and advertise it so everyone knows what the minimum acceptable bonus is. (There really is no need to have a minimum because Interior can reject any and all bids anyway.)

The "value" in coal is in its production, not in the bonus. The "bonus" should simply be a way of determining who gets the lease. Since the real value is in the production of coal, the production royalty is what is important. On surface coal, 12½ is now the statutory minimum. Interior is obviously tempted to increase that percentage by how Interior assesses the "profitability" of the proposed mine. As mentioned earlier, Interior really can not do this realistically. Interior may feel they have been

doing it by setting production royalty rates above 12½% for some recent "competitive" lease sales. However, such sales, while advertised as "competitive", were in no way "competitive". On the contrary, under Judge Pratt's order only one company could really qualify to be the successful bidder. As to "fair market value", the company that wants to keep an existing mine going, and which needs "by-pass" coal to do it, has no choice but to bid in the small block being put up for lease regardless of whether the royalty rate is 12½ or 16⅔. (Of course, the company does not absorb the higher royalty. Whatever the royalty, it is included in the price of the coal and the public ultimately pays the higher royalty.)

The real "test" of whether Interior can really lease federal coal at production royalties above 12½% for surface coal and 8% for underground coal will come when truly competitive blocks are offered for lease. At that time there may even be bidders, no matter how high the royalty. But, will the lease actually go into production? The market place will provide the answer to that question and it will do so at the time and based upon the competition the lessee then faces. (12½% of something is more than 16⅔% of nothing.)

C. LANDS UNSUITABLE

The impression one gets from reading all the criteria to be used to determine "suitability" is that when no other "values" can be identified for coal lands, such lands will be considered for leasing. At least some effort should be made to quantify how much "Roadless Areas", "Scenic Areas", "Natural Areas", "Endangered Species Areas", "Migratory Birds Areas" etc. the nation can afford. Some effort should also be made to determine "cost/benefit" ratios for such "areas" vs. coal development.

For example, Table 5-73 on page 5-154 indicates that the "Lands Unsuitable Field Test Summary" shows Montana to be 100% Historic Lands, 98.2% High Interest Habitat, 99.9% Private Surface/Federal coal. So much for Montana.

I also thought the authority for setting forth criteria used to determine "suitability" or "unsuitability" rested on statutes. In a number of instances, Table 5-72 indicates the "authority" rests on "Departmental Policy", not Acts of Congress. In the case of "Criterion 8-Natural Areas", the "authority" rests on "Departmental Policy" and a "proposed" piece of legislation. Query, suppose Congress decides not to enact the proposed legislation establishing "a National Register of Natural Areas". What happens then to "Department Policy"?

D. END-USE CONSIDERATIONS

According to Section 3.3.7 on page 3-41, the Secretary is considering "whether the Department should condition new coal leases with stipulations which specify how, where, or by whom coal would be consumed". Apparently, the Solicitor's opinion is being developed now as to the Secretary's legal authority to regulate end-use. Meanwhile, the subject of regulating end-use is under continuing study.

VI. CONCLUSIONS

A. The Final ES will be found by Judge Pratt to be a legally adequate ES for Interior's coal leasing program, vis a vis NEPA, and Judge Pratt will lift his injunction.

B. Interior will therefore have a "legally defensible" coal leasing program. It by no means follows that the Program will produce new leases.

C. Even if leasing finally does occur under Interior's Program, it by no means follows that there will be production of coal from such new leases.

D. As the title of the Draft ES acknowledges, the "Preferred Alternative" is much more than a federal coal leasing program. The title calls it a Federal Coal Management Program. Given the massive mineable coal deposits owned by the U.S. which "overhang" the coal industry and the markets for the coal industry; given the mine shutdowns occurring in the east as the OSM regulations are applied and the costs of complying with OSM, EPA, OSHA and other agency regulations become apparent; and given the necessity for significantly increasing coal production to stand any chance for our Nation to avoid economic disaster resulting from physical shortages of energy or from the Nation's inability to afford higher volumes of higher priced oil from overseas; knowledgeable people will recognize the Proposed Program is more than a Coal Management Program. It is a coal control program. By reason of the foregoing, it is a National Coal Control Program.

In essence: the government will determine what coal is needed; what to make available; where and when to make it available; what must be mined; how it will be mined; at what production rate; at what return on investment and possibly how, where, and by whom the coal will be consumed.

Query: if Congress set out to nationalize the nation's coal industry what further "controls" would be necessary to achieve that result beyond what the "Preferred Alternative" provides?

Sincerely,

Charles W. Margolf

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A Concerned Citizen

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Spokane
Uintah-Ouray
Ute Mountain
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Yakima
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Executive Director:
Ed Gabriel

February 9, 1979

Mr. Frank Gregg
Director, Bureau of Land Management
U. S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Gregg:

I would like to offer the following comments concerning the Department of the Interior's Draft Environmental Statement (DES) for the Federal Coal Management Program on behalf of the Council of Energy Resource Tribes (CERT). CERT is an organization of 25 energy resource-owning Indian tribes. Resource management is a major concern and responsibility of tribal governments, as it is for Federal government. I would first like to state that the preferred alternative described in the DES reflects the Department's intention to design a truly comprehensive resource management program. The preferred alternative is a vast improvement over previous efforts of the government to manage its resources, and we commend the Department for that.

CERT is concerned about a few elements of the preferred alternative. First, there is no provision for tribal participation in the program except as a part of the general public. The Department has made a commendable and appropriate effort to include states and localities in decisions concerning federal coal leasing and development. States, however, do not speak for Indian tribes. In fact, they often have interests that are in direct conflict with tribal interests. Many CERT tribes, especially those in the Powder River, San Juan River, and Fort Union coal producing regions are very near and in some cases, virtually surrounded by, land bearing federal coal. Development of that coal would have a profound impact on the natural, social and economic environments of these reservations. Tribal governments are responsible for managing the impacts of energy development on our reservations. We want and need to coordinate our efforts with the federal program, but to do this we must be directly involved in your planning process.

Federal agencies, when developing programs, often do not include provisions for the participation of Indian tribes -- usually not out of ill-will but merely as an oversight. When that happens, tribes are often ignored and have tremendous difficulty participating in federal agency decisions.

CERT therefore urges you to make explicit provisions for tribal participation in the program. Tribes should be given the opportunity to participate in the ranking and selection of tracts, setting regional production targets, land-use planning, and assessing impacts. Attached to this letter is a list of our suggested modifications to the sample regulations to allow for active tribal participation.

Indian tribes should have been given the opportunity to participate in the development of the DES and the preferred alternative. Perhaps the lack of tribal participation accounts for the inadequate treatment in the DES of the significant impacts of the program on those tribes located near federal coal regions. We feel that greater attention should be paid to those impacts in the section on regional impacts.

Finally, CERT is encouraged to see the Department is committed to assuring that the government receive a fair return for its coal. We live in the West. We know the land and the resources. We know their value. And we know the true cost of mining. Indians, like all Americans, share in the ownership of federal coal. When the owners receive less than a fair return for their coal it is a subsidy by ordinary citizens to industry.

The CERT tribes know this very well. For too long we allowed our coal to be developed through standard form leases at standard royalty rates. We know better than that now. We've looked around and have found that most other countries that own and produce minerals do so under agreements that are far more sophisticated than those in this country — agreements that allow for greater control and a greater return for the resource owners. Tribal governments are learning from other countries and CERT feels that the United States government should take steps to follow their lead. Therefore, CERT strongly supports the Department's intention to remain flexible concerning the forms and terms of agreements and to use discounted cash flow analysis to determine fair market value.

Although we do realize that the federal government's flexibity in designing agreements for the production of federal coal is somewhat constrained by requirements of various laws, we hope that you will strive to maximize the benefits of coal production to its owners within those laws.

In closing, I would once again like to commend the Department for an effective effort to develop a comprehensive coal management program. We hope that these comments will be helpful in further refining that program.

Sincerely,

Peter MacDonald
Chairman

RECOMMENDED MODIFICATIONS OF THE "EXAMPLE"
REGULATIONS TO PROVIDE FOR THE PARTICIPATION OF
INDIAN TRIBES IN THE FEDERAL COAL
MANAGEMENT PROGRAM

Proposed language changes are underscored

I. Part 3420 - Competative Leasing

(1) 3420.0-2 Objectives

. . . and to ensure that Federal coal is developed in consultation, cooperation, and coordination with the public, State, local, and tribal governments, and involved Federal agencies.

3420.2 - 6 Consultation with States and Indian Tribes

Before making formal determination of lands acceptable for further consideration for leasing, the Bureau of Land Management shall consult with the State Governor and the State agency charged with the responsibility for maintaining the State's unsuitability programs. In situations where a tribal government administers areas within or proximal to the boundaries of a comprehensive land-use plan being prepared by the Bureau of Land Management, the Bureau of Land Management shall consult with the tribal government to obtain their recommendations on unsuitability (43 C.F.R. 3461.4-1).

(3) 3420.3 Regional production targets

3420.3-1 General

The Secretary in consultation with the Secretary of the Department of Energy, affected State Governors, Indian Tribes, and other concerned parties shall establish . . .

(4) 3420.3-2 Evaluation of Coal Needs

Add new subsection

(c) The Secretary shall discuss the preliminary regional coal production targets with affected Indian tribes seeking their views about the adequacy of the estimates and suggested revisions. The Secretary shall particularly seek the tribes views regarding the relationship between the regional production targets and potential socioeconomic considerations.

The existing subsections c,d,e, and f would be renumbered accordingly.

(5) 3420.4-4 Regional Tract Ranking, Selection, and Scheduling

3420.4-4(c)(1) The ranking, selection, and scheduling process shall be done by the authorized officer in close consultation with the Governor(s) within whose State(s) the region is located and in consultation with representatives of all affected Indian Tribes and Federal surface management agencies.

(6) 3420.5 Final Consultations

. . . the Secretary shall formally consult with the State Governors of those States within which Federal coal lease sales are under consideration. The Secretary also shall formally consult with any Indian tribe(s) that would be affected by any Federal coal lease sales . . .

(7) 3420.5-2 Consultation with Governor and Indian Tribes

Add new subsection (c)

Before adopting a regional lease sale schedule, the Secretary shall consult with tribal governments which administer areas within or proximal to the lands which may be leased. The Secretary shall give the tribes a specified period of time to comment, not less than 30 days or more than 60 days, before issuing a final decision regarding any potential Federal coal lease sale that would affect the tribes.

II. Part 3460 Environment

3461.2 Criteria for designating land unsuitable for all or certain types of coal mining

(1) (g)(2)(i)(A) with the concurrence of the State or Indian Tribe to which the site, structure, or object is of regional or local significance only; or . . .

(2) h(2)(i) the area or site is of regional or local significance only, with the concurrence of the State and affected Indian Tribes; or . . ..

(3) j(1) Lands containing habitat deemed critical or essential for plant or animal species listed by a States or an Indian Tribe pursuant to State or Tribal law as endangered or threatened shall be considered unsuitable for coal mining.

(4) n (1) Federal lands which the land management agency and the State or Indian Tribe(s) jointly agree are fish and wildlife habitat for resident species of high interest to the State or Indian Tribe(s) and which are essential for maintaining these priority wildlife species shall be considered unsuitable for coal mining. Such lands may include appropriate buffer zones as determined jointly by the land management agency and the State or Indian Tribe(s).

(5) (x)(1) a buffer zone of Federal lands necessary to provide protection for any adjacent area designated as land unsuitable for mining by the State or on Indian Lands shall be considered as land unsuitable for coal mining.

(2) . . . The buffer zone may be modified or eliminated where the land management agency, in consultation with the State or Indian Tribe, determines that all or parts of the zone are not necessary to protect the designated area.

(7) 3961.4-1 Consultation with Local and Tribal Governments

Prior to designating Federal lands unsuitable for all or certain types of surface mining operations, the Secretary shall consult with the appropriate State, local, and Tribal agencies.

OFFICE OF THE GOVERNOR

WILLIAM P. CLEMENTS, JR.
GOVERNOR

January 22, 1979

056

U. S. Department of Energy
Economic Regulatory Administration
Office of Fuels Regulations
Washington, D. C. 20461

Gentlemen:

The Draft Environmental Impact Statement pertaining to the anticipated Federal Coal Management Program has been reviewed by interested State agencies in accordance with the National Environmental Policy Act of 1969. Your State Environmental Impact Statement Identifier Number is EIS 8-012-011.

The detailed comments of the Texas Department of Water Resources, the General Land Office, and the Texas Department of Agriculture are enclosed for your information and use.

The Budget and Planning Office appreciates the opportunity to review this document. If this Office can be of further service in this matter, please do not hesitate to contact me.

Sincerely,

Tom B. Rhodes, Director
Budget and Planning Office

Enclosures

EXECUTIVE OFFICE BUILDING • 411 WEST 13TH STREET • AUSTIN, TEXAS 78701

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
A. L. Black, Chairman
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Harvey Davis
Executive Director

TEXAS WATER COMMISSION
Felix McDonald, Chairman
Dorsey B. Hardeman
Joe R. Carroll

January 5, 1979

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JAN 8 1979
Budget/Planning

Mr. Roy Hogan, Acting Director
Governor's Budget and Planning Office
Executive Office Building
411 West 15th Street
Austin, Texas 78701

Subject: U.S. Department of the Interior, Bureau of Land Management-- Draft Environmental Impact Statement -- Federal Coal Management Program, December 1978. (State of Texas Reference: EIS-8-012-011).

Dear Mr. Hogan:

In response to your December 19 memorandum, the Texas Department of Water Resources (TDWR), has reviewed the subject draft environmental impact statement (DEIS) which analyzes various alternative Federal coal management programs, including the Department of the Interior's own tentatively-preferred alternative, and to assess the environmental impacts of each alternative. The DEIS is programmatic in scope; it discusses national and interregional impacts associated with the Federal coal management program. The assessment of impacts involving use of the Department of Energy's National Coal Model, includes coverage of the 12 coal supply regions of the U.S., 3 production levels (i.e., "low", "medium", and "high"), 3 alternative management strategies, 2 projection periods (i.e., 1985 and 1990), 5 phases of coal production-and-use cycle, and 27 impact categories. The subject DEIS also includes a set of illustrative regulations which could be used to implement the coal management program.

The vital aspect of the U.S. Department of the Interior's preferred alternative program provides that all major decisions relative to the future leasing of Federal coal lands be done as an integral part of the Federal land-use and activity planning process of the Bureau of Land Management, Department of the Interior under the Federal Land Policy and Management Act of 1976 and the Federal Coal Leasing Amendments Act of 1976, and the Forest Service, Department of Agriculture under the Multiple-Use Sustained-Yield Act of 1960 and the National Forest Management Act of 1976. Furthermore, the federal coal leasing program would rely directly on the Department of Energy's national energy projections to establish the quantity of coal to be mined. The preferred alternative program emphasizes State, local government, and public participation in all aspects of the program.

Post Office Box 13087 Capitol Station • Austin, Texas 78711 • Area Code 512 475-3187

TDWR offers the following review comments with respect to the Texas Coal Region from the standpoint of TDWR's statutory State-wide functions, responsibilities, and interests relative to water resources planning, development, and regulation:

1. Pages 5-6, 5-26, E-2, and E-6

TDWR invites attention to the following specific items in the DEIS relative to water resources which impact significantly on the State of Texas:

a. The analysis of water availability is based on preliminary data pertaining to water flow and consumptive water use compiled by the U.S. Water Resources Council (WRC) (i.e., U.S. Water Resources Council, 1978 (Preliminary Review Copy) -- "The Nation's Water Resources-- The Second National Water Assessment", Washington, D.C.). See DEIS at page 5-26, section 5.2.2.6, fourth paragraph under the caption "Water Impacts".

b. The DEIS presents water resources data, including total streamflow, and estimated present and future water requirements corresponding to the WRC's Texas-Gulf aggregated subregions (ASR) 1107 (Lower Red River Basin), 1201 (Sabine-Neches Basin), 1202 (Trinity-San Jacinto Basin), 1203 (Brazos River Basin), 1204 (Colorado River Basin), and 1205 (Navidad - Guadalupe - Mission - Nueces Basin) (See Appendix E of the DEIS at pages E-2 and E-6).

Even though the said water availability data and the related projection methodology are presented with numerous conditions and cautions regarding the validity, applicability, and practicality of the data and methodology, TDWR has more fundamental objections to the use of the said WRC preliminary data. TDWR's review comments, suggested revisions, and point-by-point assessment relative to WRC's draft review report on the "Second National Water Assessment", were presented in letter dated August 25, 1978, to the Secretary of the Interior. A copy of the said August 25, 1978 letter is attached for ready reference, and special attention is invited to comment 12, thereof. TDWR has been advised that WRC and the Department of the Interior are taking appropriate action to resolve the important problems and questions raised in the review of the Second National Water Assessment.

Because the Texas Coal Region is not one of the eight coal regions for which the Department of the Interior is preparing separate, detailed environmental impact statements, (see DEIS at page 3-6, section 3.1.1.7, fourth paragraph under caption "Meeting the Requirements of the National Environmental Policy Act".), TDWR suggests that final version of the subject programmatic environmental impact statement include assurances that revised, coordinated WRC data relative to the Texas-Gulf Region water availability and demand will be used. TDWR emphasizes that the Second National Assessment without substantial revision of the data will not be useful in determining the present and future adequacy of Texas water resources, and that the use of these unrevised data in major energy-related programs may unavoidably and seriously hamper the solution of energy-related problems. Unfortunately, the use of WRC's ASR aggregated water resources data appears to generalize water data beyond the point of being useful. The aggregate, generalized data tend to portray conditions as covering a much broader area than they actually do.

2. Pages 7-1, -2, section 7.1.1.5 ("Water Resources")

TDWR believes that the programmatic water resources impact analysis on pages 7-1 and 7-2 should include the following points:

a. The consumptive use of water by secondary or induced energy - related or industrial activities (e.g., "mine-mouth" steam electric generating plants) may further degrade water quality in certain streams and rivers by increasing dissolved solids concentrations and by reducing the assimilative capacity for other pollutants as a consequence of reduced streamflows.

b. Recent Federal regulations mandating the use of sulfur removal techniques on all new coal-fired power plants will substantially increase both water consumption and the amount of sulfur-bearing sludge that must be disposed.

c. The cumulative effect of Federal regulations which involve increased water demands and consumptive water use in energy-related activities, is cause for concern in water-short areas such as certain portions of the Texas Coal Region, as the national coal production and conversion programs are escalated. TDWR believes that the feasibility of mitigative actions should be considered with respect to federal regulations which do not provide the necessary engineering

flexibility to adapt energy - related activities to local, geologic, climatic, and hydrologic conditions. For example, the revised national standards for thermal discharges from electric power plants do not appear to provide the maximum, reasonable latitude for engineering flexibility in the design of cooling systems. This flexibility would permit the optimum selection and use of cooling systems (i.e., wet cooling towers, single-purpose cooling reservoirs, once-through cooling on multiple-purpose reservoirs, streams, or estuaries, and dry cooling systems, etc.) which would provide the most desirable balance between water conservation (including minimum water consumption) and environmental protection.

The recent Surface Coal Mining Control and Reclamation Act of 1977, and the proposed implementing Federal Regulations 30 CFR Chapter VII, contain stringent provisions relative to water resources in connection with surface mining operations and mined-land reclamation operations which do not appear to adequately recognize the unique, local geologic, climatic, and hydrologic limitations of the Texas Lignite Coal Region. TDWR submitted review comments on the said proposed 30 CFR Chapter VII, in letter of November 9, 1978, to the Office of Surface Mining Reclamation and Enforcement, Department of the Interior, through the Budget and Planning Office, Office of the Governor.

TDWR appreciated the opportunity to participate in the interagency review of the subject document, pursuant to the provisions of circular No. A-95, Office of Management and Budget. TDWR will continue to work closely with all agencies concerned to ensure reasonable consistency and compatibility between energy and water resource planning, development and management, within the purview of our statutory, state-wide responsibilities and interests.

Sincerely,

Harvey Davis
Executive Director

Attachment as stated

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
A. L. Black, Chairman
Robert B. Gilmore, Vice Chairman
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TEXAS WATER COMMISSION
Joe D. Carter, Chairman
Dorsey B. Hardeman
Joe R. Carroll

Harvey Davis
Executive Director

August 25, 1978

The Honorable Cecil D. Andrus
Secretary of the Interior
C Street
Washington, D.C. 20240

Dear Secretary Andrus:

The Texas Department of Water Resources is providing the following comments regarding "The Nation's Water Resources - The Second National Water Assessment" by the U.S. Water Resources Council.

Our review of the above-mentioned documents has identified serious problems which we believe will severely impinge upon the usefulness of the assessment to assist Federal Program Managers, the Administration, and the Congress in establishing and implementing water resource policies and programs. It is our view that if this material were used to establish and implement water policies and programs, the welfare of people in Texas as well as other areas of the nation would be seriously harmed. From our review of the assessment reports, as well as our experiences and knowledge acquired as a regional assessment sponsor for the Texas Gulf region and from our active participation in assessment activities for the Arkansas-White-Red and the Rio Grande regions and from our review of those parts of each report that pertain to Texas, we present the following observations and comments.

1. The twenty-one regional sponsors that performed the work and developed information relating to the state/regional viewpoint for the specific problem analysis are not identified. We understand that approximately one-half of the $6.5 million assessment budget was devoted to developing the state/regional viewpoint in the specific problem analysis phase of the assessment, yet the reports reflect principally the federal view as written by various federal agencies.

2. A Texas Gulf regional report was prepared by the Texas Department of Water Resources under contract with the

Water Resources Council. The text of the original report was transmitted to the Council on November 14, 1977 and was written on the basis of the state/regional viewpoint as set forth in the Department's draft planning document entitled "Continuing Water Resources Planning and Development for Texas" and from information supplied by Louisiana and New Mexico relative to parts of those states which lie within the Texas Gulf region. In our review of the draft copy of this report as issued by the Water Resources Council, we have found that the state/regional viewpoint as originally set forth in the text and figures has been almost entirely replaced with information developed by federal agencies. We feel that the federally prepared data are erroneous in many instances and in other instances are not supported and appropriately qualified and explained. Replacing the state/regional information with the federally-developed information has resulted in two kinds of errors occurring as a consequence of significantly different data replacing the original information; i.e., the context of statements and the accuracy of statements. As an indication of the significant differences in the information, please refer to page 12-38 in the Texas Gulf regional report which reads as follows: "Domestic withdrawals are projected to average 1,621 million gallons per day (the state/regional value was 3,379 million gallons per day), by the year 2000, an increase of 414 million gallons per day (the state/regional value was 1,953 million gallons per day) or 34 percent (The state/regional value was 137 percent) above the 1975 level." Examples of such gross discrepancies can be found throughout the Texas Gulf, Arkansas-White-Red and Rio Grande regional reports where the state/regional data have been replaced with what we consider to be totally unrealistic and inaccurate information.

We do note, however, that Sections (C) Problems, (D) Summary, and (E) Conclusions and Recommendations regarding the federal role in water resource planning and development, data and research, and institutional factors in each of the three regional reports listed above were based upon information contained in the state/regional viewpoint. This fact is not explicitly stated nor is it stated that the information was derived from national future information. Consequently, to avoid any confusion and to correctly inform the readers we strongly suggest the basis of the information contained in these sections of the regional reports be correctly identified.

3. The Texas Gulf regional report also contains significant errors in the streamflow and water use data. In Table 1, page 12-46, line one, the "national future" (NF) estimate (Streamflow at Outflow Points) for 1975 is 12,266 million gallons per day while the "State Regional Future" (SRF) estimate is 6,220 million gallons per day. The reason for this significant difference is that different probability levels were used in computing the national data from those used to compute the regional value. As the footnote in Table 1 indicates, the state/regional value was based upon a probability of the streamflow being exceeded 95 percent of the time. However, it is not apparent from the table or the table footnotes that the national future estimate was based upon an 80 percent probability level. This can only be determined from an analysis of the Statistical Appendices (Volume A-2, Part I, Page 15).

Also, the state/regional water withdrawal value and consumptive use values set forth in Table 1, page 12-46, were based upon average conditions and should have been incorporated in Table 2, page 12-47 as opposed to indicating that the values were not estimated.

In an effort to help correct this material and to aid the Water Resources Council in their understanding of the state/regional estimates for inclusion in the final report, we have prepared three correct tables (copies enclosed). The attached Tables 1, 2, and 3 set forth information concerning conditions for average, the 80 percent streamflow probability (the national future "dry" year condition), and the 95 percent streamflow exceedence probability for both the national future information and the state/regional information, respectively; i.e., in the corrected tables, "apples" are compared with "apples," and "oranges" with "oranges." In the Water Resources Council's assessment report, the Council is comparing their "apples" with our "oranges." Two of the footnotes on the enclosed tables have been altered to reflect what we believe to be better definitions of the "national future" and the state/regional future." Where the "national future" has been defined as the Water Resources Council's estimate of 1975 and most probable future conditions, we have deleted the words "more probable." For the state/regional future definitions, we have exchanged estimates

by regional sponsors reflecting state/regional desires and objectives, to the regional sponsor's (Texas Department of Water Resources) estimates of 1975 and future conditions.

We recommend that these definitions and appropriate footnotes be adopted and used in each of the regional reports pertaining to Texas. In addition, we believe that all of the information pertaining to the different probability levels cited above should be developed and displayed in the final reports for the Arkansas-White-Red region and for the Rio Grande region.

4. An examination of the streamflow values in each of the enclosed tables will also demonstrate another of our major concerns with the assessment materials. Even though there is clearly a significant variation between the average annual conditions and the 95 percent probability exceedence conditions, almost all of the discussions and conclusions set forth in the written material and tables in the Summary Report, Parts I through V and each of the three regional reports pertaining to Texas are based upon average conditions. In Texas, the average or arithmetic means of historical conditions rarely ever occurs since there is significant variation from year to year. Therefore, it is highly inappropriate to base water resources policies and decisions upon arithmetic means. All such analyses and discussion should be corrected and based upon appropriate measures of the variances.

   We note the following statement on page 10, Part I, Introduction "The user is cautioned that, in view of the report's technique of estimating water flow quantities at the exit point of the subregions and regions there are limitations on its use. For example, the analysis might show that the mainstem of the river reflects problems of water supply while it is known that the tributaries reflect no such difficulties. Conversely, the tributaries may be known to have an inadequate use/supply balance, yet the mainstem reflects very favorable water conditions." This statement in and of itself, although useful as a warning to readers and potential users of the assessment reports, clearly reflects upon the integrity and usefullness of the estimates to which it refers and upon the entire assessment. As you are perhaps aware, we have continually voiced our concern about the methodology employed in the assessment since its inception.

5. There are several points made in the Texas Gulf region (12) report pertaining to specific problems which we feel are misleading and require clarification. These are:

   a. Page 12-51, paragraph 2: The statement is made that: "Some cities within the Dallas-Forth Worth metroplex and the City of Corpus Christi are facing short-term water supply problems." Since this statement is not true of the Cities of Dallas or Fort Worth, we suggest that the word "smaller" be inserted between the words "some" and "cities"; i.e., "Some smaller cities...".

   b. Page 12-51, paragraph 2: The statement is made that: "These existing supplies will not be able to satisfy forecasted water requirements to the year 2000, and unless additional reservoirs are constructed, severe water shortages may occur." While strictly speaking this may be true, to avoid giving a distorted view of the Dallas-Forth Worth metroplex, we suggest that the following sentence be added at the end of paragraph 2: "However, this fact is well-recognized, and is being addressed in existing local long-range water supply plans."

   c. Page 12-86, paragraph 2: The statement is made that: "On the basis of projected needs, however, supplies available from existing reservoirs in the area, existing diversion facilities from Lake Tawakoni in the adjacent Sabine River basin, and completion of authorized federal projects will allow the region to just barely keep pace with growing water needs." Of course, the first question is "based on whose projected needs?" Therefore, we recommend that the above sentence be replaced with the following: "On the basis of state/regional projected needs, supplies available from existing reservoirs in the area, existing diversion facilities from Lake Tawakoni in the adjacent Sabine River Basin, and completion of authorized federal projects will allow the region to meet its water needs to the year 2000."

   d. Page 12-30, paragraph 2: The first sentence refers to the proposed raw water conveyance facilities from Lake Palestine to Dallas but omits any mention of the proposed second raw water transmission line from Lake Tawakoni to Dallas. We suggest that the last sentence be reworded as follows: "Construction of proposed additional raw water conveyance facilities from Lake Tawakoni in the Sabine River Basin and from Lake Palestine in the Neches River Basin to the City of Dallas will provide additional supplies when completed."

   e. Pages 12-86, Water Quality Problems -- Dallas-Fort Worth Area (Trinity River and Tributaries) - Texas (Problem Identification Number 3). Although this section describes the problem, it falls short of telling the whole story. In a report of this type, reference should also be made to solutions and progress toward these solutions. Accordingly, we request the addition of a summary paragraph as follows: "All of the major wastewater treatment plant owners in the upper Trinity River Basin are currently upgrading their treatment facilities which when completed are expected to result in a significant improvement in the quality of the Trinity River."

   f. Page 12-87, paragraph 1: The statement is made that: "Downstream of major treatment plant discharges, sludges that contain high concentrations of carbon, nitrogen and phosphorus accumulate on the river bottom." Since it has not been proven unequivocally that benthic deposits in the river are due primarily to wastewater sludges, we suggest that this sentence be reworded as follows: "At some points, sludges that contain high concentrations of carbon, nitrogen, and phosphorus accumulate on the river bottom."

6. The state/regional information for the Texas Gulf region contained in the statistical appendix Volume A-1 (economic, social, and environmental data) is totally in error. The correct information can be found in the Texas Gulf Specific Problem Analysis Activity IV Report which was transmitted to the Council December 19,1977.

7. We have serious questions about a statement which appears on page 33 of the draft document entitled "Part II Water Management Problem Profile." The statement is as follows: "In reviewing surface water supply conditions of the nation it is not apparent that there are regions with sufficient amounts of truly excess water supplies to be tranferred to the Texas High Plains and other ground water mining areas." This conclusion has been stated without explanation of method, or supporting evidence. Our studies and assessment of data and reports published by various federal and state agencies lead us to believe the statement quoted above is inaccurate.

8. The map on page 46 of the "Summary Report" has been oversimplified to the extent that in our opinion it is inaccurate. Thus, we recommend that it be removed from the report.

9. Another major concern with the draft reports relates to the fish and wildlife instream flow approximations. In the explanatory notes contained in the statistical appendix, Volume A-5 Water Supply and Use Analysis, it is stated that fish and wildlife instream flow approximations "are based on judgemental estimates of monthly streamflow required at subregional outflow points to maintain habitat for aquatic and riparian plants and animals." We strongly question the accuracy of these "estimates" and recommend they be deleted from the tables since the authors apparently recognize their inadequacy and have clearly stated that additional studies are needed to obtain better data for state, regional, and subregional planning.

10. The United States Department of Commerce, Maritime Administration review of "Part III Functional Uses of Water," Chapter 9, Water Requirements for Navigation (pages 210-231) revealed several points with which they disagree. Comments are quoted for your information.

   a. "Some of the material on page 211 is not clear and other points are oversimplified. The implication is that water transportation organizations are not responsible because they use "commodity movements" as a basic economic indicator. We contend that port and waterway authorities are aware that their existence is not solely self-serving. They provide economic benefits to the immediate area and to far-flung hinterlands. In so doing, they must consider water supply and environmental interests. Those same interests have performed an excellent and worthy task by educating port interests about environmental concerns. It remains a simple truth, however, that while ports occupy a very small percentage of the area under question, their economic contribution is generally the most significant.

   b. "A misleading impression is possible on page 211. The decline of water transportation did occur with the advent of railroads. The railroads essentially bought up their water competitors and did not try to develop them. The passage of the Panama Canal Act in 1912 began the revival of inland waterborne transport by divorcing railroads from the ownership of the water carriers and by conferring authority on the ICC to act in the public interest.

   c. "We take issue with the statement on page 230 'The waterway system of the United States is essentially

complete...'and with the qualified prediction, 'A limited number of improvements in port and harbor approaches may be made.' A trading nation, even one with a favorable balance of payments, should not consider that it has attained the optimum in transportation technology. The possibility of improvement should not be written off.

"We also note that the energy serving aspect of water transportion was not mentioned. Decision makers should be aware of the comparision by modes:

BTU's per ton-mile by mode	
Water	500
Rail	750
Pipe	1,850
Truck	2,400
Air	6 300

"As long as inland water transport is free of non-compensatory competition, its economic advantages (and disadvantages) will be appropriately obvious."

11. The Conclusions stated on pages 49 and 50 of the "Summary Report" contain some statements that are unclear, some that are inappropriate to the issue addressed, and some that we do not feel are supported by the data and analyses of the assessment. Comments pertaining to our questions about the conclusions are as follows:

    a. Integration of Water Quality and Quantity Management: It is our impression that water quality protection requires major investments, regardless of the time at which it is done, and thus we feel the first sentence of this conclusion is somewhat misleading as it is now phrased. The second sentence of this conclusion contributes further to the confusion by asserting that "Aggressive programs directed at water quality management should have been initiated before major depletions occurred as a result of industrial and agricultural development and urbanization." We perhaps could concur that in some instances water quality management programs should have been initiated earlier in time, but we fail to comprehend the reference to, "depletion." Thus, we suggest that this conclusion statement be reconsidered.

    b. Environmental Quality: The assessment analyses procedures and data did not include methods whereby effects, "... in the planning and decision making process..." could be evaluated. Thus, we do not feel that the conclusion is supportable by the work of the assessment.

    c. Integrated Ground Water Management: The following conclusion is stated: "A major deficiency is the result of past failure to provide institutional arrangements and to plan for integrated management of ground and surface waters. Critical ground water problems have emerged in the High Plains of Texas north to Colorado and Nebraska, in central Arizona, and parts of California. The problem might have been avoided if interrelationships between ground and surface water had been taken into account."

    Since the High Plains area of Texas has no major streams, and natural recharge to the Ogallala Aquifer from precipitation is negligible, we question how the problem of ground water decline could have been avoided by institutional arrangements for integrated management of ground and surface water. Since there are no significant surface water resources in this area, the statement quoted above is useless as a water resource problem solving statement and is highly misleading to the reader. Thus, we recommend that the statement quoted above from the conclusions be substantially revised to place emphasis upon the important contribution that these regions are making to the nation's food and fiber supplies. Such a statement, based on the facts as contained within the assessment, would thereby recognize the need to give serious attention to finding a long-term solution to the water supply problems of the areas where exhaustion of the ground water supplies is threatening a significant part of our nation's source of food and fiber. The High Plains Ogallala Study, P.L. 94-587, is directed toward finding such a solution for the High Plains area referenced above.

    d. Failure to Adopt (sic) Policies to Changing Conditions: The procedures and data of the assessment did not address this issue; thus, we feel that no analyses have been performed which leads to or supports this conclusion and it therefore should be deleted from the report. (Even though we do not feel this is an appropriate or supportable conclusion of the assessment, we argue that it is only logical for those who enter into long or short term agreements with

the federal government or any other entity to resist changes in such agreements or changes in the policies underlying the agreements. Such agreements impinge upon capital asset values, employment, income, and local community tax bases).

    e. Floodplain Management: This conclusion recognizes a serious problem. No reference is made as to the significant benefits that structural flood protection has produced nor does the conclusion statement recognize the need for improved forecasting of "flash flood" type storms, improved monitoring and warning systems for those who reside in flash flood" threatened environments, or the potential problems and inadequacies of, "...nonstructural alternatives in the control and alleviation of flood damages."

    f. Major Water Development: The conclusion that water development and management programs have contributed to national objectives of economic development should perhaps be the leading conclusion of the report. However, it should be expanded to include recognition that water development has also contributed to improvements in the environment including control of floods in the systems referenced, provided perennial streamflow in areas where streamflow was previously intermittent, and made large areas inhabitable by people who would otherwise be crowded into the megalopolises of the nation.

    g. Sharing of Responsibilities: The implication is given that water resources programs are largely funded from federal sources. Since the assessment did not address this issue, the conclusion is not supportable. In Texas, for the period 1972-1976, more than 70 percent of average annual expenditures for fresh water supply development were supplied from local and state sources of funds.

    h. Integrated and Comprehensive Planning: The opening statement, "except for some sections of the country, there is now no water crisis." is highly misleading. During the 1976-1977 period, the entire western United States and large areas in the southeast suffered from a drought so severe that the Congress enacted special legislation that provided hundreds of millions of dollars for use in making drought relief loans and granting financial assistance to communities and individuals. Thus, we do not understand how the conclusions of this assessment can present a statement

such as that quoted above. We recommend that the problem of drought be explicitly included as one of the major problems of water supply to which water resources planning and development programs must be addressed.

    i. The Future: The statement is made that, "Population has not grown at the rate anticipated, and the projections of future water requirements for this Second Assessment are considerably lower than those made for the First Assessment." Although this may be true at the national level, it is misleading in that it fails to recognize the major and extremely significant population dislocations and shifts among hydrologic regions, as a result of the energy crisis and associated technological and employment adjustments, as well as population shifts for other reasons, all of which impinge in major ways upon regional demands for water supplies and water quality protection. In many regions these development pressures are encountering water resources and other public service supply problems which local communities were unable to foresee in time to avoid a crisis, and now that such problems have arisen, a large number of local communities affected are unable to solve these problems and meet their immediate needs. We recommend that the statement quoted above be revised to recognize this type of regional water resources problem. The assessment identified a number of regions where the problem exists.

12. Another of our major concerns with the usefulness of information set forth in the assessment materials lies in the original delineation made by the Water Resources Council dividing the nation into 21 water resource regions. Each of these areas were seemingly arbitrarily defined to approximate a major drainage or hydrologic area and therefore, except in the six areas of the nation containing river basin commissions, do not consider the boundaries of any political subdivision such as a state, county, city, or other political entity which has jurisdiction over the use and development of water. To our knowledge there is no one existing legal political entity in the Arkansas-White-Red region, Texas Gulf region, or Rio Grande region that has sole jurisdiction concerning water matters. Rather, in each of these regions there are numerous local, state, and federal entities that are concerned with water matters. Planners and decision-makers at each of these levels of responsibility require water and related information for their respective areas (state, county, cities) as well as for homogeneous subareas within their areas of legal responsibility.

    To date, Texas' experience with national assessment as well as related data such as the OBERS projections tabulated and published

by the Water Resources Council for each of the water resource regions contained in Texas has been that no one could use the information even if we could believe in the accuracy of the data. The tabulations of data for these hydrographic areas, which cross state lines, have not provided information necessary for federal, state, and local area planning or operations. To be useful for these planning purposes, accurate tabulations must be developed which recognize the jurisdictions of political subdivisions. To accomplish these purposes, the State of Texas has engaged in a vigorous planning and data acquisition program. Consequently, we feel that the assessment and related information published by the Water Resources Council for areas not in accord with accepted political boundaries is unacceptable for water resource planning. We further recommend that the various federal agencies engaged in water resource planning and development not be mandated by the Water Resources Council to use this type of information for planning purposes as is now the case. This view is supported by the fact that for the past several years various federal agencies have on numerous occasions requested from the State of Texas detailed water and related information to supplement or make sense out of the assessment and related tabulations which these agencies are required by the Council to use for planning purposes.

We believe that your timely consideration of the above issues is particularly important since the President in his water policy initiatives has recently called for increased state participation in the federal decision-making process. In this regard, we look forward to working with you and the Water Resources Council to develop programs and information which will be beneficial to the federal, state, and local decision-making process.

Sincerely yours,

Harvey Davis
Executive Director

Enclosures (3)

cc: Texas Congressional Delegation
Governor Dolph Briscoe
Lieutenant Governor William P. Hobby
Speaker of the House Bill Clayton
Lindon Williams, Chairman of Senate Natural Resources Committee
Tom Craddick, Chairman of House of Representatives Natural Resources Committee
Harry McAdams, Director, Office of State/Federal Relations
Texas Water Development Board Members
Joe Carter, Chairman, Texas Water Commission

Table 1

STREAMFLOW AND WATER USE
AVERAGE ANNUAL CONDITIONS

Category	1975		1985		2000	
	NF	SRF	NF	SRF	NF	SRF
VOLUMETRIC DATA (mgd) Mean Annual Conditions						
Streamflow at Outflow Point(s)	28,270	26,368	23,559	22,097	23,137	18,152
Freshwater Withdrawals	16,925	10,510	15,930	13,212	15,538	16,991
Agriculture	11,718	7,397	9,530	8,230	7,655	9,499
Steam-Electric	724	296	1,000	712	2,262	1,508
Manufacturing	1,931	1,177	2,560	1,466	2,443	2,273
Domestic	1,207	1,427	1,380	2,556	1,621	3,379
Commercial	283	NA	317	NA	300	NA
Minerals	1,044	194	1,133	234	1,245	284
Public Lands	<1	19	2	14	2	15
Fish Hatcheries	17	NE	11	NE	11	NE
Other	0	<1	0	<1	0	33
Freshwater Consumption	11,262	8,161	10,225	10,005	10,530	12,490
Agriculture	9,527	6,726	7,794	7,487	6,328	8,558
Steam-Electric	99	149	270	357	994	752
Manufacturing	572	387	1,003	551	1,915	1,073
Domestic	413	794	467	1,485	541	1,936
Commercial	94	NA	103	NA	118	NA
Minerals	555	100	588	119	632	146
Public Lands	<1	NE	2	NE	2	NE
Fish Hatcheries	0	NE	0	NE	0	NE
Other	0	5	0	6	0	24
Ground Water Withdrawals	7,222	7,172	NE	4,961	NE	3,398
Reservoir Evaporation	1,289	1,743	1,289	1,964	1,289	1,972
Instream Approximation Fish and Wildlife	22,917	NE	22,917	NE	22,917	NE

NE - Not Estimated
NA - Not Available
NF - National Future, The Water Resources Council's estimate of 1975 and future conditions.
SRF - State/Regional Future, the regional sponsor's(Texas Department of Water Resources) estimate of 1975 and future conditions.

Table 2

STREAMFLOW AND WATER USE DATA
FOR 80% EXCEEDANCE CONDITIONS

Category	1975		1985		2000	
	NF	SRF	NF	SRF	NF	SRF
VOLUMETRIC DATA (mgd) Dry Year Conditions						
Streamflow at Outflow Points(s)	12,206	11,900	7,789*	7,630	7,570*	3,685
Freshwater Withdrawals	18,299	10,510	17,026	13,212	16,398	16,991
Agriculture	13,091	7,397	10,628	8,230	8,515	9,499
Steam-Electric	724	296	1,000	712	2,262	1,508
Manufacturing	1,931	1,177	2,560	1,466	2,443	2,273
Domestic[1]	1,207	1,427	1,380	2,556	1,621	3,379
Commercial	283	NA	317	NA	300	NA
Minerals	1,044	194	1,133	234	1,245	284
Public Lands	<1	19	2	14	2	15
Fish Hatcheries	17	NE	11	NE	11	NE
Other	0	<1	0	<1	0	33
Freshwater Consumption	12,464	8,161	11,193	10,005	11,296	12,490
Agriculture	10,730	6,726	8,761	7,487	7,094	8,558
Steam-Electric	99	149	270	357	994	752
Manufacturing	572	387	1,003	551	1,915	1,073
Domestic[1]	413	794	467	1,485	541	1,936
Commercial	94	NA	103	NA	118	NA
Minerals	555	100	588	119	632	146
Public Lands	<1	NE	2	NE	2	NE
Fish Hatcheries	0	NE	0	NE	0	NE
Other	0	5	0	6	0	24
Ground Water Withdrawals	7,222	7,172	NE	4,961	NE	3,398
Reservoir Evaporation	1,289	1,743	1,289	1,964	1,289	1,972
Instream Approximation Fish and Wildlife	22,917	NE	22,917	NE	22,917	NE

* ASRs 1203 and 1204 demands may exceed ASR water supply in future dry years.
1/ SRF domestic water use includes commercial and institutional requirements.

NE - Not Estimated
NA - Not Available
NF - National Future, The Water Resources Council's estimate of 1975 and future conditions.
SRF - State/Regional Future, the regional sponsor's (Texas Department of Water Resources) estimate of 1975 and future conditions.

Table 3

STREAMFLOW AND WATER USE DATA
FOR 95% EXCEEDENCE CONDITIONS

Category	1975		1985		2000	
	NF	SRF	NF	SRF	NF	SRF
VOLUMETRIC DATA (mgd) Dry Year Conditions						
Streamflow at Outflow Point(s)	6,305*	6,220*	1,643*	1,949*	1,540	-1,906*
Freshwater Withdrawals[2]	18,299	10,510	17,026	13,212	16,398	16,991
Agriculture	13,091	7,397	10,628	8,230	8,515	9,499
Steam-Electric	724	296	1,000	712	2,262	1,508
Manufacturing	1,931	1,177	2,560	1,466	2,443	2,273
Domestic[1]	1,207	1,427	1,380	2,556	1,621	3,379
Commercial	283	NA	317	NA	300	NA
Minerals	1,044	194	1,133	234	1,245	284
Public Lands	<1	19	2	14	2	15
Fish Hatcheries	17	NE	11	NE	11	NE
Other	0	<1	0	<1	0	33
Freshwater Consumption[2]	12,464	8,161	11,193	10,005	11,296	12,490
Agriculture	10,730	6,726	8,761	7,487	7,094	8,558
Steam-Electric	99	149	270	357	994	752
Manufacturing	572	387	1,003	551	1,915	1,073
Domestic[1]	413	794	467	1,485	541	1,936
Commercial	94	NA	103	NA	118	NA
Minerals	555	100	588	119	632	146
Public Lands	<1	NE	2	NE	2	NE
Fish Hatcheries	0	NE	0	NE	0	NE
Other	0	5	0	6	0	24
Ground Water Withdrawals	7,222	7,172	NE	4,961	NE	3,398
Reservoir Evaporation	1,289	1,743	1,289	1,964	1,289	1,972
Instream Approximation Fish and Wildlife	22,917	NE	22,917	NE	22,917	NE

* ASRs 1203 and 1204 demands may exceed ASR water supply in future dry years.
1/ SRF domestic water use includes commercial and institutional requirements.
2/ Assumed dry year conditions for NF

NE - Not Estimated
NA - Not Available
NF - National Future, the Water Resources Council's estimate of 1975 and future conditions.
SRF - State/Regional Future, the regional sponsor's (Texas Department of Water Resources) estimate of 1975 and future conditions.

General Land Office
AUSTIN, TEXAS 78701
BOB ARMSTRONG, COMMISSIONER

Environmental Management
1700 N. Congress
Austin, Texas 78701

Telephone: 512/475-6902

January 4, 1979

Mr. Kennith G. Gordon
Economic Development and Transportation
Budget and Planning Office
Office of the Governor
Executive Office Building
411 West 13th Street
Austin, Texas 78701

Re: Draft Environmental Statement: Federal Coal Management Program

Dear Mr. Gordon:

Members of the General Land Office have reviewed the report on the Federal Coal Management Program. We favor the "preferred program" as compared to the alternatives considered.

This agency concurs with the implementation of this project and we have checked the Agency Review Transmittal Sheet accordingly.

Sincerely,

A. J. Bishop

A. J. Bishop
Telephone: 512/475-1540

AJB/cc

Approved: Mike Hightower
Mike Hightower
Program Manager/Director

TEXAS DEPARTMENT OF AGRICULTURE

REAGAN V. BROWN, COMMISSIONER / P. O. BOX 12847 / AUSTIN, TEXAS 78711
AN EQUAL OPPORTUNITY EMPLOYER M/F

RECEIVED DEC 21 1978 Budget/Planning

COMMENTS

We have reviewed the Draft Environmental Statement for the Federal Coal Management Program and recognize the monumental task involved.

Considerable attention is given in the statement to the impact on agricultural resources. We would like to add the following suggestions: (1) That consideration be given to protect prime and unique agricultural lands in the initiation of mining activities; (2) That consideration be given to the concentration of industries such as generating plants which plan to utilize coal or lignite to fire their boilers. Some recognition of the possibility of "acid rain" should be given; and (3) That emphasis be given to technologies which do not require "strip mining."

Person Conducting Review (Signature) [signature]

Agency Texas Department of Agriculture Date 12-20-78

DNA-PEOPLE'S LEGAL SERVICES, INC.
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PETERSON ZAH
DIRECTOR

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COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT

FEDERAL COAL MANAGEMENT PROGRAM

There are numerous comments I wish to make here, most of them addressing specific sections of the Draft Environmental Statement. First, however, I would like to make two more general comments on what I feel are serious inadequacies in the Statement.

The primary, and I think most serious problem with the Draft Environmental Statement, is that it totally ignores the issue of cumulative impacts which I know face the San Juan River Coal Region and which I presume may be present in other coal areas as well. As you should be well aware, no development takes place in a vacuum. When an area faces extensive coal development on the one hand and extensive uranium development on the other, as the San Juan River Region does, any discussion of the impacts of one type of development is virtually useless without a thorough consideration of the other type. Treatment of topics such as water impacts, socio-economic impacts or air quality impacts are fatally flawed without analysis of the cumulative impacts of all development planned for one area. I will discuss further the need for investigating and addressing cumulative impacts in the specific comments I will make later.

The second general, but very important, issue I would like to raise is that although some very sound ideas are set out in the Draft Environmental Statement concerning the mitigation of impacts, especially social, economic and cultural impacts, through extensive planning and consultation with those affected by the proposed development, the

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PAGE TWO:

people of at least one area, the San Juan River Coal Region, have already been precluded from participation and will not benefit from these planning mechanisms because the Bureau of Land Management has already prepared and is ready to approve an Environmental Impact Statement for a large portion of that region, the Star Lake-Bisti region. In the preparation of the Star Lake-Bisti Statement planning mechanisms such as those set out in this Draft Environmental Statement were not followed, and although the statement deals primarily with the construction of a railroad spur and transmission lines, it is a certainty that if the construction is approved and completed the Star Lake Bisti Region will effectively be designated as one destined for massive coal development. The large expenditure necessary for the construction of the railroad spur and transmission lines will make development of the area invetable.

Unless the people in the San Juan River Coal Region are assured of the benefits of the planning process set out in this Draft Environmental Statement by the postponement of approval of the Star Lake-Bisti Coal Environmental Statement until compliance with the planning process of the final Federal Coal Management Program can be assured, serious problems of unequal treatment under the program are raised, especially as they relate to those people in the San Juan River Region.

I will now discuss some specific problems to be found in the Draft Environmental Statement, which I will take up in order of their appearance in the statement.

PAGE 3-8, TABLE 3-1:

The listing and discussion of the unsuitability criteria contain no system for objectively ranking the various criteria as they apply to specific areas. As the criteria, and the application of them, are

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PAGE THREE:

presented in the Draft Environmental Statement, an agency may make a primarily subjective decision as to the suitability of an area for coal mining without complying with any uniform system of determination. A system such as this, with no absolute standards for decision-making, is one that will result in unequal determinations dependent on such factors as personal perferences, local consensus or industry pressures. An objective ranking system should be instituted to insure objective, uniform decisions.

PAGE 3-18:

In discussing the planning mechanism used by the Bureau of Land management in determining an area's potential for development the following statement is made:

> "Areas may be eliminated (from coal development consideration) where surface owners indicate definite preferences against the leasing of the deposits underlying the private surface. Application of this final screen would be at the option of the local land manager, and it would not be applied where a consent had previously been granted by a landowner".

The Surface Mining Control and Reclamation Act of 1977 provides that the consent of the owners of private surface overlying federal coal must be obtained before surface mining may begin (Section 714). Therefore allowing the local land manager to essentially override the preferences of the surface owner in designating the land suitable for development, causes serious problems in the application of the law. By designating land, the surface of which is owned by people who oppose surface mining, as suitable for coal development consideration, the local land manager would create a situation where tremendous pressures to consent to the mining would be brought on the surface owners by

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PAGE FOUR:

industry and government agencies wishing to develop land already designated as suitable. In this way the owner's right to choose which is guaranteed by the Act is interferred with. The Surface Mining Control and Reclamation Act does not include a provision for the overriding of the surface owner's decision by any governmental agency. The spirit of the law is violated by allowing the local land manager to override the surface owner's preference in designating land as suitable for coal development.

There is also an inconsistency with the planning process mandated by the Surface Mining Control and Reclamation Act here. The surface owner must be consulted during the planning process and since there is no provision for override of the surface owner's decision on the final lease, it should be presumed that no opportunity for override in the planning process is allowed either.

A consistent interpretation and application of the Surface Mining Control and Reclamation Act is called for. Confusion and unequal application of the law will result if present Bureau of Land Management policies are not made consistent with the Act. The final Environmental Statement should reflect a resolution of this problem.

PAGE 3-21:

The discussion of Threshold Development Levels again raises a problem I discussed earlier here. The statement is made that the threshold concept would be "particularly appropriate when considering socio-economic impacts". The point is made that a certain area may only be able to support a certain level of development.

Certainly the San Juan River Coal Region is an area where threshold development is of vital importance. Yet by preparing, and presumably approving, the Star Lake-Bisti Coal Environmental Statement,

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PAGE FIVE:

the Bureau of Land Management has committed the area to massive coal development without employing any consideration of what level of development the area can accomodate. Again, the people of the San Juan River Region are being denied the benefits of a final Federal Coal Management Program.

PAGE 3-24:

Since virtually all of the owners of private surface in the San Juan River Coal Region are Navajo Indians who speak little or no English, some discussion of how the rights of these people under the Surface Mining Control and Reclamation Act will be protected should be included. Details about the translation of the actual results of a consent under the Act should be included in order to insure that these people really know what they are consenting to. No discussion of this problem appears in the Regional Statement and it is of such significance that it should be discussed in the final version of this statement.

PAGE 3-41:

The discussion of compliance with the provisions of the National Environmental Policy Act is troubling for the same reasons that I have set out above. While the plan is to provide a two-level system of Environmental Impact Statements, one national and interregional and one site-specific and intraregional, both applying the provisions of the Federal Management Program, compliance with the Act is threatened by the preparation of the Star Lake-Bisti Statement and the committment of resources which will be the inevitable result of approval of that statement. Unless the final statement on this area is delayed and modified to comply with the final federal Coal Management Program serious questions about the Management Program and its compliance with NEPA are raised.

LETTER REGARDING DES:
Page Six:

I will discuss the problems contained in the discussion of water impacts all at once, even though the pages I will be citing are dispersed throughout the Draft Environmental Statement.

PAGE 3-20:

Section 522 of the Surface Mining Control and Reclamation Act sets out certain standards for the protection of the environment. One of the standards set out is that the protection of all aquifers be provided for.

In the San Juan River Coal Region, especially in the San Juan Basin where most of the coal acitivity of the Region will take place, coal development will probably depend exclusively on water from the existing aquifer. However no discussion of how the aquifer will be protected is included in this section. Since aquifers provide the only water supply for much of this region, discussion of mitigation measures is imperative.

PAGE 4-31:

The statement is made here that "potential evaporation exceeds normal precipitation by a factor of 6 or more" in the San Juan River Region. Certainly this factor has a direct relationship upon the recharge to aquifers used for coal development. Yet no discussion of the total effects of massive dewatering and minimal recharge is contained anywhere in the Draft Environmental Statement.

PAGE 4-33:

The statement is made here that water from the aquifers likely to be drawn upon in coal development are of "poor to fair quality". This is a mistatement, as the Westwater Canyon member of the Morrison Formation which is the aquifer most likely to be used in coal development and contains excellent drinking water used by the Crownpoint area,

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PAGE SEVEN:

impacts to this aquifer will affect the only good drinking water available in the San Juan Basin. Substantial impacts such as this should be treated more fully in the final statement.

PAGE 4-36:

The statement at issue here is that water will be "a stringent limit on development". How stringent a limit water will be must be more fully discussed and here we run into the problem of cumulative impacts. Given the massive uranium development planned for the San Juan River Region and the equally massive coal development there is no doubt that water will be an absolute limit on development. Discussion of this limitation is imperative.

PAGE 5-7:

In the Coal Impact Estimation Program no mechanism for determining or mitigating impacts to water quantity is included. Since the reduction of water quantity in the aquifers of the San Juan River Region is a certainty given the development planned for the area, this issue should be addressed in any estimation of coal impacts.

PAGE 5-26:

Under the section dealing with water impacts the problem of cumulative impacts is very serious. According to the figures in Table 5-10 water demands in the San Juan River Region from coal development could range from 30,000 to 52,000 acre feet per year depending upon the alternative chosen. It is a fact that in the San Juan Basin, where most of the coal development in the Region will take place, the only water available for coal development will come from the Westwater Canyon aquifer. Claims that water can be obtained from the San Juan River are unrealistic and misleading. Information from the New Mexico State Engineer's Office and the United States Geological Survey reveal the following facts:

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PAGE EIGHT:

Extensive uranium mining is planned for the San Juan Basin during the same time period in which coal development is planned. The uranium ore in this area is located in the Westwater Canyon aquifer. Therefore water must be pumped from the aquifer in order that mining may take place. Dewatering rates of 2,000 to 3,000 gallons per minute are common and rates up to 10,000 gallons per minute have been reported. The total quantity of water pumped out of the Westwater Canyon by presently proposed mines could exceed 40,000 acre-feet per year by 1983. The effect of this dewatering will be to lower the water table of the Westwater Canyon by as much as 1,500 feet within a 50 mile radius of the mining operations. Artesian pressure will also be reduced or eliminated so pumping will become a necessity. Since the Westerwater Canyon is from 2,000 to 3,000 feet below the surface to begin with, this lowering of the water level effectively makes pumping any water remaining in the aquifer to the surface an engineering and financial nightmare.

In the Draft Environmental Statement is a water budget of anywhere between 30,000 and 52,000 acre feet per year for coal development in spite of the fact that in the San Juan Basin uranium development alone could realistically deplete the aquifer. There is a very real possibility that there will be no water available for coal development in this area. Any discussion of water impacts without consideration of this fact is incomplete and totally unsatisfactory.

PAGE 5-28:

The discussion of water rights here should include the problem of Indian title to groundwater. The complexity of the issue, the problems of competing interests between the state and Indian water rights and the fact that no final determination of the ownership of the water underlying much of the coal in the San Juan River Coal Region

LETTER REGARDING DES:
PAGE NINE:

should be addressed in any discussion of the feasibility of coal development in that region.

PAGE 5-41:

As I have pointed out above no discussion of the availability of water for coal development in the San Juan River Region is sufficient without addressing the realities of the situation which are:

1) Virtually every drop of San Juan River water is already allocated and it is probable that none will be available for coal development.

2) Coal development in the San Juan Basin will have to depend entirely on water from the Westwater Canyon aquifer.

3) Cumulative demands on this aquifer will raise a very real possibility that no water will be available for coal development.

The problems raised here with respect to the water impacts of coal development go to the initial question of whether the entire San Juan River Coal Region should be considered at all for any development. These impacts should be discussed at the national level and should be included in the final Environmental Statement for the Program.

These problems should also be discussed at the regional level. Again, the Star Lake-Bisti Coal Environmental Statement does not address any of these problems. If the regional statement is approved and implemented the area will be committed to development without the knowledge that there will be sufficient water to support that development.

I will discuss the problems in the statement concerning reclaimability of the land all at once even though the references to this problem are dispersed throughout the statement.

PAGE 4-33:

Although the Surface Mining Control and Reclamation Act mandates

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PAGE TEN:

reclamation of lands which have been mined, and although the statement here describes the soils of the San Juan River Region as "shallow, saline and erodable", no substantial discussion of the actual methods for reclaiming this type of soil is made.

PAGE 4-34:

The statement "all areas may be reclaimed if topsoil can be replaced and adequate moisture is available". This type of meaningless assertion makes a mockery of the whole process of mitigating environmental impacts. Of course all areas can be reclaimed if those conditions are present. By by facts stated in this Draft Environmental Statement, the San Juan River Coal Region is one of fragile topsoil and virtually no precipitation. The possibility that reclamation may not be possible should be discussed as well as the resulting possibility that with no, or minimal, reclamation coal development may well force the migration of all those people living in the area to be developed.

PAGES 5-17 and 5-22:
TABLE 5-9:

Here the statement is made that all mined land must be reclaimed. However by looking at the reclamation potential set out for the San Juan River Coal Region it is apparent that there is no certainty that reclamation may be achieved. By disguising the reclamation potential for the region in the number -6.9, a reader could be led to believe that there is some hope for the area. But an examination of the criteria used to reach that number combined with the realization that the scale of reclaimability runs from -8 to +8, reveals that there is a real possibility that land in this area will not be restored to its prior use, grazing. The possibility that land will not be reclaimed effectively must be included in the final statement or the people in this area will have only an apology as mitigation of this problem.

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PAGE ELEVEN:

I will now address several separate problems in the order in which they appear in the Draft Environmental Statement.

PAGE 4-34:

The San Juan River Coal Region is one of exceedingly complex land status. The discussion here should include a description of these various categories of land which include: Tribal trust land, Tribal fee land, Individual Indian allotments, Executive Order Land (set aside for exclusive Indian use and occupancy), Public Domain Land, Private Land and State Land. Each of these types of land is administered differently and by different individuals and agencies of the Tribal, State and Federal governments. To merely state that most of this land is "Federal" land is to minimize the difficulties inherent in land use planning in this area. The difficulties are so great that a tri-partite agreement had to be reached between the Navajo Tribe, the Bureau of Land Management and the Bureau of Indian Affairs for the management of the area of proposed coal activity. This agreement and the problems which caused it to be adopted should be included in the final statement.

PAGE 5-50:

Any discussion of air quality impacts in the San Juan River Region must include the effect of the cumulative impacts of uranium mining and milling.

PAGE 5-82:

The discussion of impacted communities is inadequate in the following respects:

1) Although it is stated that a growth rate of more than 10% on small communities would require special planning, no discussion is made of what effects any population increase would have on

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PAGE TWELVE:

areas where there are essentially no services, as would be the case throughout the San Juan River Region.

2) No discussion is made of impacts on communities where there are no services, no housing and no private land on which to build these things.

3) No discussion is included about the boom-bust phenomenon experienced in areas which have sudden development but which have no structure to hold the influx of people after the development is over.

4) No discussion is included about the effects of increased population on Indian communities, where English is not spoken and traditional lifestyles are dominant.

These issues must be addressed in the final statement.

PAGE 5-85:

The discussion of population increases is faulty because it does not take into consideration that population increase will most often take place in areas away from the major population centers. Especially in the San Juan River Region, the population increases will take place where there are no established communities, and therefore the impact of increased population will be much greater than estimated in the Draft Environmental Statement.

PAGE 5-94:

The evaluation of where the work force for coal development will come from is based on the assertion that agricultural workers will be available for the work. In the San Juan River Region there are virtually no agriculturce workers to draw upon. Virtually all employees in the coal development will have to come from outside the area. This influx of outsiders constitutes a considerable impact and shoud be

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PAGE THIRTEEN

discussed.

PAGE 5-94:

The evaluation of impacts to agriculture based on the dollar value of the productivity of an area does not allow consideration of the very real impacts to areas where people grow or raise only enough to support themselves. These situations must be addressed.

PAGE 5-94:

A discussion of who will bear the financial impacts of coal development in Indian communities should be included here. Much coal activity is planned for Indian areas which are not on a reservation and the issues of who will bear the costs is pertinent here.

PAGE 5-96:

Here again there is a problem of what will be done in Indian areas with no tax base.

PAGE 5-115:

There must be a discussion of the impacts of coal development in areas where there are no existing paved roads. The following statement points out the inadequacies of the Draft Environmental Statement in this regard:

"Perhaps the most important impact would be the perceived, rather than actual, impact of truck traffic on a local community-in terms of traffic volume, noise and vibrations, coal spillage and visual impacts".

This irresponsible statement points out that whoever wrote this Draft Environmental Impact Statement has no perception of problems outside the scope of suburban life where this statement might have some validity.

In the entire San Juan Basin, that area of the San Juan River Coal Region where most coal development will take place, there are

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PAGE FOURTEEN:

two paved roads, neither of which comes near the areas to be developed. The impacts of traffic related to coal development in this area are tremendous and must be addressed.

PAGE 6-1:

The discussion of the implementation of the President's mandate on comprehensive planning through cooperation with the state governments points out a problem. Virtually none of the area to be developed for coal in the San Juan Basin is subject to state or strictly federal control. The absence of a mechanism to involve members of the Indian communities in the planning process effectively precludes these people from participation in the process. Mechanisms must be devised and implemented for this participation or the effect of the absence of such mechanisms must be addressed in the final Environmental Statement.

PAGE 6-3:

The statement is made here that the changes brought about by coal development will bring about long-term opportunities for impacted communities. In many areas the changes will actually spawn ghost towns and the eradication of traditional lifestyles. These end results should be discussed in detail in the final Environmental Statement.

This concludes my comment on the Draft Environmental Statement for the Federal Coal Management Program. I trust the points I have raisnd will be reflected in the final Environmental Statement.

Very truly yours,

Lisa G. Gmuca
Law Clerk

Prepared by Carolyn R. Johnson

Received 12/14/79

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COMMENTS
on the
PROPOSED COAL MANAGEMENT PROGRAM
and
DRAFT ENVIRONMENTAL STATEMENT

This programmatic statement and the preferred alternative represent an improvement over previous coal management statements and programs. PLI commends the Department for recognizing the need for a federal coal management policy and for integrating coal management with land use planning.

We strongly urge the Department to issue a new draft statement. This draft uses questionable assumptions for analyzing the need for leasing, contains no truly programmatic alternatives, and erroneously describes the environment and analyzes impacts. Because these problems are so massive, the reader and the decision-maker are mis-informed about the nature of the program and its expected impacts. Thus, the draft must be redone and public comment solicited once again.

Our comments are organized into a section which describes some inadequacies of the draft statement and preferred program, and a section which analyzes and revises the lands unsuitability criteria.

DESCRIPTION OF INADEQUACIES

Assessment of the Need for New Leasing

The analysis of national need for leasing is based on several questionable and illogical assumptions:

1. It presumes that national need can be determined on a regional level at a later date (p. 3-4, 5). However, Judge Pratt in the NRDC v. Hughes

specifically ordered the Department to consider the need for any leasing in the new programmatic statement. To be legal and useful to the decision-maker, the assessment must be on a national level first.

2. The analysis makes a circular argument. The DOE National Coal Model, which is the basis for the conclusion that federal leasing is needed, uses a least cost model. One of the presumptions in that model is that federal leasing will be resumed to make available least cost coal (p. H-7, Sec. H.2.1.10).

3. The statement justifies additional federal leasing and production of Western coal because of more rapidly increasing western demand for coal (p. 2-10). Yet the projection of production and consumption in Tables 5-2 and 5-3 show western production grows at twice the rate of western consumption between 1976 and 1990.

State participation.

The preferred alternative sets up a special role for state participation in coal management (p. 3-26, Sec. 3.2.5). While the States would be "consulted" at many points, there is no discussion of their corresponding responsibilities. We believe that the States and governors should be given the same participation rights as the general public and industry, and no more. Although the statement is made that the states' role stops "short of providing them veto power over Federal decisions," the "governor would also be informally consulted prior" to a decision to lease. In practical political terms they will assume a veto power over coal decisions. As the recent battle over water projects has shown, giving the states something for nothing establishes a habit that is almost impossible to change.

Alternatives.

The selection and discussion of alternatives in the statement is seriously deficient. Most of the so-called alternatives are not true programmatic management alternatives at all but are leasing pieces that may differ slightly from the small leasing part of the preferred management alternative. They concern leasing only,

not coal management -- which is the subject of this statement. Federal coal management can include leasing but extends to many more activities than coal leasing alone, such as land use planning, use of non-coal resources, management of existing leases, compliance with the National Environmental Policy Act, etc.

Following are examples of how the alternatives fail to be legal programmatic alternatives.

1. No federal leasing alternative (Sec. 3.1.2). This means no leasing until 1985. It is not inconsistent with the preferred alternative which is described as "should any leasing be contemplated" (p. 3-6, Sec. 3.1.1.8).

2. Process outstanding preference right lease applications. (Sec. 3.1.3) The discussion states, "this alternative is not necessarily inconsistent with the preferred program or with the alternative of leasing to meet DOE production goals." (p. 3-7)

3. Emergency leasing. (Sec. 3.1.4) This is the same management as that in the "emergency leasing" phase of the preferred alternative (p. 3-6). The lease terms would differ slightly.

4. Lease to satisfy industry's indications of need. (This may be a true alternative but not enough information is given to determine how management would differ from the preferred alternative through all probable steps. It appears to concern only lease tract selections.

5. State determination of leasing levels. (Sec. 3.1.6) This is illegal because present statutes mandate the responsibility for leasing to the Department of Interior. This is admitted in the statement, "Both structures would require Congressional action to amend the governing statutes, especially FLPMA and SMCRA." (p. 3-14). It differs only in one small aspect from the preferred alternative, state selection of the amount and timing of new leases.

6. Lease to meet DOE production goals. The description states that the

Department of Interior "would not call for any adjustment in those (DOE) projections," (p. 3-14) and the Department may make some adjustments in the DOE projection under the preferred program:

> "Biennially the Department of Energy (DOE) updates its national coal production targets ... These targets would be submitted to the Department of the Interior. The Department would review and, if necessary, adjust the portion of the national targets which applies to the eight regions containing Federal coal." (Emphasis added.) (p. 3-5, Sec. 3.1.1.2.)

In conclusion, real alternatives were not chosen, and those chosen are not sufficiently described for the reader or the decision-maker to understand the possible courses of action.

Start-up Special Considerations. (p. 3-28)

The preferred alternative is based on the sound principle of integrating coal management with land use planning for all resources. While the principle is sound, the execution of that principle, as proposed, misses the mark and misses so badly that the principle is lost. The major problems with the preferred alternative are the hasty schedule, which calls for lease sales in mid-1980, and the premature use of the program now, without waiting for the proper decisions to be made. This haste creates massive problems in all program areas. For example, this does not allow enough time for the District BLM offices to put into effect the new land use planning system.

Instead, adoption of the real, preferred alternative is put off and the "start-up special considerations" (p. 3-28) phase is substituted for up to 15 years, according to the proposed planning regulations (1601.6-3(c)). This substitute is nothing less than the activities done under the old system, EMARS (Energy Minerals Activity Recommendation System), dusted off and injected with life again.

As the basis for EMARS activities, land use plans for federal coal resource areas were hastily developed. BLM at that time worked under the policy

that promoting coal development on the public lands was its mission. During the development of these land use plans, coal was the prime resource, and many plans responded to industry nominations of proposed lease tracts. The management needs and uses of other resources were addressed only if they did not conflict with coal development. If conflicts arose after the plan was completed, then the plan was quietly altered to accommodate coal, at the expense of other resources. For example, the Williams Fork, Colorado, plan in its original version called for BLM to manage the Little Yampa Canyon of the Yampa River as a candidate for Wild and Scenic River status -- kept free of developments. When the W. R. Grace Corporation selected the canyon as its economically favored route for a railroad to serve its Colowyo coal mine, BLM altered the land use plan without public notice to accommodate the railroad. Other feasible and less damaging routes were available, but BLM saw its mission as serving the coal company's every whim. A canyon was destroyed.

The existing plans are based on information that is poor or lacking on some resources such as non-game wildlife populations and needs, and they deliberately ignore information on other resources such as agricultural values on private lands overlying federal coal.

The results of this land use planning are proposed to be continued under the "start-up considerations phase." The plans will be overlain with the thin veneer of the lands unsuitability criteria. Lands unsuitability criteria is a much needed management tool which we fully support. As proposed, the criteria are weak and ignore important kinds of impacts, but these can be corrected with rewriting. However, their effectiveness depends on the quality of the land use planning system, which forms the foundation. Use of the criteria cannot redress the deficiencies of the planning system, just as one can't patch a crumbled foundation. Yet these criteria are being used now, before public comment and

rewriting, before a coal management system has been chosen, before compliance with the National Environmental Policy Act, and before new land use plans have been written using the multiple use-sustained yield mandate of FLPMA (Federal Land Policy and Management Act).

These problems are caused by the adoption of the 1980 lease schedule. Yet the Department is able to lease in situations of need under the court agreement now and lease sales could be held in 1980 under that agreement, if it was still in effect. The case for a rush is not justified and furthermore, the schedule pre-empts and undercuts the goals the Department says it wants to achieve.

Description of the environment and analysis of impacts.

The description of the environment and analysis of environmental impacts section are misleading, contradictory, erroneous and perfunctory. We have selected reclamation in the West to illustrate these problems, but another component would serve as well, such as socio-economics, wildlife, water, air, etc.

1. The optimism on the potential for reclamation success in the West defies the environmental facts. For example, on page 4-34, it is stated regarding the San Juan Region:

> "All areas within the region can probably be reclaimed after disturbance, provided that topsoil is replaced as a plant medium and adequate moisture is available for plant germination and emergence."

This optimism is not backed by the facts presented in the statement. Water is in very short supply:

> "Annual precipitation average less than 10 inches for most of the region ..." (p. 4-31), and "Groundwater in the region is generally of very poor to fair quality where it is available," (p. 4-33);

the topsoil is poor:

> "The major limitations of the region's soils are shallowness, salinity and erodability." (p. 4-33);

and the climate is severe:

> "Potential evaporation exceeds normal precipitation by a factor of 6 or more." (p. 4-31).

2. The optimism on the potential for reclamation success in the West defies history. On page 5-22, a table entitled "Time Required to Reclaim Mined-Land (Western Regions)" states, by area, that very precise amounts of time are needed to reclaim to rangeland and cropland. For example, it states it takes 9.6 years in the Powder River area and 14.1 years in the San Juan area to reclaim to rangeland. Neither in the text nor the table are any areas cited as living proof of successful reclamation to rangeland, according to the standards of the Surface Mining Control and Reclamation Act and regulations. "Rangeland" reclamation is not defined. It can mean introduced annual grass species; native perennial grasses, forbs and shrubs; regular applications of fertilizer, water, and/or herbicides.

3. Sources on western reclamation are misinterpreted. For example, the 1974 report by P. E. Packer is referenced throughout the reclamation sections. However, Packer looked at only three components: soils, precipitation and vegetation from the standpoint of stabilizing the site -- not reclamation -- and his work predated and did not include sufficient field trials to determine reclamation success according to SMCRA. His work represented an early effort and in no way attempted to be anything more than preliminary work.

4. The statement neglects to meaningfully discuss the impacts of land disturbance and reclamation on other components. For example, the discussion of wildlife and reclamation on p. 7-8 is nonsensical. It does not describe reclamation using native species useful to wildlife, only "young stands of pine (5 to 15 years)," although pine would be inappropriate for many Western areas, such as the Powder River Basin.

The wildlife section purports to be part of an analysis of long-term productivity losses versus short-term use of lands (p. 7-6). It concludes that "any surface mining operation would result in a temporary loss of habitat for certain species." The implication is that the wildlife go into suspended animation or conveniently move away until their habitat or living space is reclaimed. They don't, they die. And some species may never reinhabit the area. 1/ Furthermore, the discussion of reclamation in the west to "rangeland" is based on the table on p. 5-22, discussed above, and the discussion fails to point out that reclamation to replace wildlife habitat in the west, if it can be done, takes 50-100 years. To date, it has not been done (oral communication, February 5, 1979, Harold Tyus, Office of Biological Services, U. S. Fish and Wildlife Service).

In sum, the sections on description of the environment and analysis of impacts are written in the philosophic vein of Pollyanna. They should be completely rewritten to present the facts and present logical conclusions derived from those facts.

1/ See "Wildlife in America," by Peter Matthiessen, 1959, Viking Press. This is a comprehensive history of American wildlife that vanished or became so rare that last-ditch protection barely saved them from extinction. It covers the period since white man's arrival in North America.

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February 12, 1979

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Dear Mr. Koore:

The Western Colorado Resource Council, Inc. has reviewed the draft Federal Coal Management Program Environmental Statement (ES), and submits the following comments for the record. Enclosed with the comments is a copy of the testimony presented by Mark Welsh on behalf of the Resource Council at the January 24, 1979 ES hearing held in Denver, Colorado.

Our comments are directed towards those portions of the ES concerning special leasing opportunities, surface owner consent, emergency leasing, the lands unsuitability criteria*, and other matters.

Special Leasing Opportunities

Chapters 3.3.8 and 3.2.6 refer to the provision for special leasing opportunities for rural electric cooperatives, non-profit corporations and federal agencies required in Section 2(1) of the Federal Coal Leasing Amendments Act of 1975 (FCLAA). But the ES does not adequately analyze "public body" leasing or indicate the significance this type of leasing will have in the preferred program.

When the Secretary selected the preferred program last June (Secretarial Issue Paper - the Formation of Proposal for the Coal Programatic Environmental Impact Statement), he decided that "public body" leasing would be a major component of the leasing program and that its use would be encouraged.

The details concerning possible priority for special leasing opportunities and the percentage of leases to be offered to public bodies are non-existent.

In addition, the system for considering and processing lease tracts for public body leasing must include end-use considerations. The Department seems unwilling to adopt a policy which

*under separate cover

would considfr end-use of the coal resources, but these end-use considerations could easily be considered in determining if a specific tract should be considered for a special leasing opportunity.

Surface Owner Consent

Surface owner consent is a major element in the preferred program and is of vital importance because of the fact that more than half of the federal coal in the West underlies private surface.

A major objection to the surface owner consent policy described in the ES is that the consent process continues up to and beyond the time the land is leased, and the Department can ignore a surface owner's refusal of consent and lease the coal under his surface.

Surface owner consent should be obtained early in the planning process, and if it is not obtained, the tract or area should be eliminated for further consideration for leasing. The surface owner consent (SOC) provisions of SMCRA are obviously for the benefit of land owners who do not want their land disturbed by mining. To allow split-estate tracts without SOC to proceed through various "screenings" in the leasing process places extreme pressure on the land owner who may feel he has no choice but to finally give his consent.

Emergency Leasing

The so-called emergency leasing described in the ES would perpetuate many of the deficiencies of the various short-term leasing policies adopted by the Department during the last eight years. The criteria an applicant would have to meet assures continued manipulation and speculation on the part of the coal industry. They place the Department in a role of reacting to industry-initiated proposals. Again it will be industry which dictates the time and place for federal coal development.

In western Colorado we have many examples where companies develope small private and federal lease holdings adjacent to large areas of federal coal in anticipation of receiving a larger federal lease. Although the amount of coal reserves on these small properties do not justify the company's financial investment, they do assure that the mine will have to shut down if an "emergency" lease cannot be obtained from the federal government.

If the criteria required to obtain an emergency lease remain as proposed, we will be assured that the speculation will continue. Changes in the criteria dealing with the number of years a company must be in production prior to filing an application, the basis of future production, bypass circumstances, and the applicant's inability to foresee the need for federal coal are necessary.

The fact that the lease tract would have the unsuitability criteria applied to it is meaningless because of the broad exceptions and the amount of discretion allowed the local BLM. The requirement that the sale be compatible with the land use plan offers NO protection at all, because the plans "only provide guidance" or can be changed to accomodate non-compatible proposals.

General

We find the draft ES to be totally inadequate in describing the need for leasing, the preferred program, the alternatives and the impacts that a coal management program will have on the West.

Thank you for your consideration of this matter.

Sincerely,

Tim Brater, President
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TB/kh
Encl.

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STATEMENT OF MARK WELSH on behalf of WESTERN COLORADO RESOURCE COUNCIL, INC.

RE: draft programatic environmental statement for the Federal Coal Management Program

Denver, Colorado

January 24, 1979

I. INTRODUCTION

My name is Mark Welsh and I am testifying here today on behalf of the Western Colorado Resource Council, Inc. The Resource Council is a membership corporation based in Hotchkiss, Colorado. We believe that the Interior Department needs to develop a responsible federal coal policy, and specifically, a policy which is responsive to the agricultural, social, and environmental values of the West.

My comments will be directed towards portions of the draft programatic environmental statement which address the issues of need for additional leasing, the preferred alternative, lands unsuitability criteria, and start-up considerations.

II. HAS THE DEPARTMENT ADEQUATELY IDENTIFIED THE NEED FOR ADDITIONAL LEASING?

In the sections dealing with the need for additional federal coal leasing, the Department appears to have accepted DOE projections where it is convenient, and disregarded them where they were not convenient.

In Section 2.8, the Interior Department seems to have concluded that need may be difficult to prove, but that it is better to lease too much than not enough.

In Section 2.8.1, the assumption is made that actual production of coal is not likely to occur until five (5) to ten (10) years after issuance of a lease. We question this assumption. In Colorado, we have numerous examples of mines producing coal within two years of receiving a lease. The lead time needed to get a mine in production is often exaggerated. An accurate lead time is needed in order to determine need--(the longer the lead time, the sooner the need).

This section quite accurately states that ". . . the failure of the Department to show a need for leasing was cited by the court in NRDC v. Hughes

as a principle defect in the previous coal leasing programatic ES."

Judge Pratt's Order and Opinion of September 27, 1977 requires that the Department justify the need for new leasing prior to the adoption of a new program. The Department apparently does not share this view. This is evident from a statement made by Robert Uram (Solicitor's Office, DOI) during the January 5, 1979 public information meeting in Grand Junction, Colorado. In response to a question regarding need, Mr. Uram stated that "I don't think that the Interior Department has to be able to demonstrate need to lease coal, . . .If the Department thinks it could promote competition, if it thinks it has better land than can be developed more than private land - you can think of lots of reasons in the public interest to lease." (Attachment 1)

We are disturbed by such statements and tend to view the Department's argument for need as merely a juggling of figures and acceptance of questionable assumptions needed to support its desired conclusion that leasing is needed.

III. PREFERRED PROGRAM: General Comments

The Resource Council is especially concerned about the reliance on the Bureau of Land Management's land use planning system for making major decisions in the federal coal management program. We recognize that the integration of coal management in the planning system is required by Congressional legislation. A primary concern is the fact that the new Federal Land Policy and Management Act (FLPMA) regulations are being unduly influenced by the prioritization of only one resource - COAL. Theoretically, it may be a good idea to use the planning process to make leasing decisions, but it is essential that the new land use planning system is firmly in place before the Secretary formalizes the Department's leasing policy. The FLPMA regulations must insure multiple use of all resources (agriculture, water, wildlife, timber, recreation, and others), contain adequate provisions for areas of critical environmental concern, increase public participation, and accurately reflect NEPA requirements. In addition, old plans must not be grandfathered.

Because the preferred program is based, in large part, on the bureau's planning system, we must ask -- what is the real purpose of a land use plan, and how would a specific plan regulate the management of coal? Section (3)(A)(1)

of the Federal Coal Leasing Amendments Act (P.L. 94-377) states that "No lease sale shall be held unless the lands containing the coal deposits have been included in a comprehensive land use plan and such sale is compatible with such plan." (emphasis added).

Under the present land use planning system and the proposed FLPMA regulations, almost any leasing proposal would be "compatible" with the plan. The reason for this is that the BLM claims that MFPs provide guidance, not mandatory instructions.

I would like to cite an example, under the present policy, showing that probably any leasing proposal can be found to be compatible with the BLM plan.

> -In 1976, a short-term lease application for over 2,200 acres was filed in the North Fork Valley. At that time, the management framework plan restricted short-term leases to 480 acres or less. Yet, in July, 1977, the District Manager determined that the coal lease application was compatible with the plan.

Under the proposed FLPMA regulations, it is the same thing - business as usual. Section 1601.6-3, Changing the Resource Management Plan, allows for plans to be amended so that specific proposals will no longer be in conflict with the original plan.

The essential elements of good land use planning, such as the application of adequate unsuitability criteria, multiple use management of resources, surface owner consent, and the development of socio-economic thresholds are meaningless and offer no protection if land use plans can be ignored or liberally modified.

The final FLPMA regulations must come to grips with this issue and recognize the real purpose of MFPs. We strongly urge the Department to adopt regulations which require that land use plans be mandatory. If land use plans give general guidance only and can be ignored at the convenience of non-compatible proposals, then we will question whether coal development is controlled by land use plans, or are land use plans controlled by coal development.

IV. LANDS UNSUITABILITY CRITERIA

The ES states that the critical decision during the land use planning process is the application of the lands unsuitability criteria. We are in

complete agreement with this statement, but the present criteria are totally unacceptable.

Major problems with the criteria fall into two (2) categories:

A) the exceptions; and,

B) the omissions of off-site impacts.

A) EXCEPTIONS

The exceptions are so broad and vaguely worded as to make them meaningless. The exceptions give too much discretion to the local BLM.

The general exception for underground mining ignores the severe impacts associated with underground mining. This exception states that federal lands that will be mined, where the mining will result in no surface effects, will be considered suitable. How is it going to be determined that there will be no surface effects in a given area? The general exception goes on to state that the unsuitability criteria will be applied where underground mining will produce surface effects. A concise definition of surface effects is needed, and it should include the definition of "surface coal mining operations" of Section 710 of SMCRA.

B) OMISSIONS

The criteria are limited to on-site non-cumulative impacts. The criteria do not apply to off-site socio-economic impacts. This approach is extremely narrow and must be changed. The Department must incorporate into the criteria 1) off-site access and development problems; 2) ability of local communities to provide necessary social services; 3) the "carrying capacity" of an area; 4) water usage, and the probable diversion of agricultural water to municipal and industrial uses; and many other social and economic factors needed to determine whether an area is suitable for mining.

Chapter 3 states that land use planning will be responsive to local communities and land owners affected by federal coal development. This will prove impossible to achieve if off-tract criteria are not developed. We are told that surface owner consultation and consent, along with a multiple use analysis, will provide the opportunity to consider these off-site impacts, but those of us in western Colorado are left unprotected by this assurance, since Section 3.2.4.1 states that surface owner consent does not apply to underground

mining.

We have little faith that the BLM's multiple use analysis in the land use planning process will do more than briefly consider and then ignore impacts to other resources and the local communities. This lack of faith is based on our experience with the 1977 minerals revision of the North Fork MFP. The multiple use analysis resulted in a recommendation that many specific tracts be rejected for further consideration for leasing because of major resource conflicts and unacceptable impacts on local communities. The status of these "reject" tracts was later changed by the State Director so as to allow their development.

Although the Resource Council recognizes that all screening of coal lands cannot take place in any one step of the planning process, we encourage the Department to make appropriate changes in the unsuitability criteria to eliminate deficiencies identified in these and other comments.

V. SPECIAL START-UP CONSIDERATIONS

The Resource Council is concerned about the legality of the special start-up considerations described in Section 3.2.8 of the ES. The first paragraph of this section states that "Much of the general resource inventory and land use planning required under procedures described above will have been completed or will be well begun by the date of publication of the final version of this statement."

In plain English, these start-up considerations include:

A) Use of existing land use plans;

B) The premature application of the unsuitability criteria; and,

C) 1980 Lease Sale Date.

A) EXISTING LAND USE PLANS.

The Department should not rely on existing MFPs because many of them were prepared under EMARS. In addition, these plans were adopted without the benefit of FLPMA, and might remain that way for 15 years (1601.6-3(c)). It is probable that these plans did not comply with the 1600 series manuals, and none of the plans complied with NEPA. Also, many MFPs have been criticized because of lack of data in the unit resource analysis, excess of discretion, limited time for preparing plans, and lack of public involvement. For these

and other reasons, it is obvious that the Department should toss the old MFPs out and start with a clean slate.

B. PREMATURE APPLICATION OF UNSUITABILITY CRITERIA.

The application of unsuitability criteria should be halted because of the following reasons:

1. The criteria are part of the preferred program and should not be applied until the criteria are in final form and a coal program in effect.

2. The criteria are being applied prior to public comment.

3. The final criteria could be different than the proposed criteria.

4. The Department is locking itself into the preferred alternative, and will be unable to seriously consider other alternatives.

5. The BLM does not have an adequate data base.

6. The criteria are being applied to ten (10) priority leasing areas.

7. The criteria are being applied to existing approved MFPs, some of which should not have been approved.

8. Instructions state that application of the criteria " . . .should, in effect, confirm prior planning decisions." (F.R. No. 79-4, Oct. 13, 1978).

9. The criteria are being applied to (approximately 900,000 acres) acreage sufficient to result in at least forty (40) potential lease tracts in Colorado, Wyoming, Montana, and Utah (F.R. 78-85, Sept. 21-78).

10. The November, 1978 to May 1, 1979 schedule violates NEPA and the District Court's Order in NRDC v. Hughes (Attachment 2, Terris letter of Nov. 24, 1978).

C. 1980 LEASE SALE DATE.

These start-up considerations would not be necessary if the 1980 coal lease sale date was not so rigid. Both the public and the Department would benefit if this leasing date were abandoned so that DOI could take the time to "do it right" and develop a satisfactory coal policy without frantically trying to meet political deadlines.

Unfortunately, we are doubtful that DOI will halt its application of the unsuitability criteria and abandon the other start-up considerations. A draft instruction memo from the Director to the State Directors concerning

planning for the preferred alternative makes it perfectly clear how important is the mid-1980 lease sale schedule. A major portion of the schedule pertains to new regionals in Powder River, Uinta-Southwest Utah, and Green River-Ha rns Fork. The memo reads, in part, "We have also been given permission to delete elements from the preferred alternative if necessary to hold a 1980 sale."

This memo, the December 8, 1978 Federal Register notice for the unsuitability criteria, the memos documenting selection of areas for applying the criteria, and not-too-subtle threats by an Interior Department official, leave no doubt as to which direction the Department is heading.

In ending my testimony, I would like to make something just as clear as all those Bureau memos-that the new program looks like a glorified EMARS, or, as they call it in Washington,"Son of EMARS". And when we know of remarks by Department officials to the effect that "it's too bad what is going to happen to that nice little valley", we can only conclude that the Interior Department might be able to change a process, but is unable to influence the end result. So, in whose hands does that rest?

Thank you for your time and consideration.

Mark Welsh

Mark Welsh
Western Colorado Resource Council, Inc.

Mw/kh

Original 2/12/79

February 11, 1979
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COMMENTS OF THE COLORADO OPEN SPACE COUNCIL MINING WORKSHOP ON THE DRAFT ENVIRONMENTAL STATEMENT, FEDERAL COAL MANAGEMENT PROGRAM

These comments supplement the oral and written statements presented by the COSC Mining Workshop at the January 25, 1979 Denver hearing.

I. OVERVIEW

It is difficult to overestimate the importance to Colorado and the West of having a sound federal coal management program in place. For too long, federal lands - and especially federal lands containing coal - have been managed in a haphazard fashion which has catered to the interests of user industries. Among other things, this has resulted in the issuance of hundreds of federal coal leases containing billions of tons of coal. These leases, of course, were issued at industry's behest and without much thought to environmental considerations. Production from these leases alone will cause vast changes in our region. Those changes are already happening in many areas as federally-approved mines are significantly raising coal production, yet the Draft ES predicts that this is only the start: Western coal production from those existing leases is slated to be nearly four times the 1976 level by 1985 and almost six times it by 1990. We are told this will occur even without leasing. Quite understandably, our members are greatly concerned with these projections, especially in light of the Department of Interior's propensity to lease coal and to exercise little control over the rate and timing of development from existing leases. The Department's premature implementation of the lands unsuitability criteria, the purpose of which is to prepare for lease sales next year, and such actions as proceeding with a Final West-Central Colorado ES even though five of the six mining plans are invalid and obsolete tell us that though Administrations have changed, Interior's coal management policies and actions have remained the same.

This is the legacy which the Department must face up to if hopes to build

public confidence in and get acceptance for a coal management program. In effect what is needed is for high-level Interior officials to rein in the bureaucracy, which is comfortable doing what it has always done - expediting coal development. Field personnel up to the State Directors must be given the message loud and clear that BLM is entering into a new era of land management, and then the Bureau must do so. Old habits and accustomed ways of land management will not die easily, but we are hopeful that it can be accomplished if Washington truly wants to see it done.

The formulation of a comprehensive coal management program for the public lands offers an outstanding and unique opportunity to correct the errors of the past. Any new program, however, must be based on the following premises:

1) Coal is but one of the many valuable resources of the public lands. It is not the dominant resource and planning for the public lands must not be allowed to revolve around it. Because of this basic concept, the coal management program should not precede or take precedence over the formulation and implementation of a program for managing the public lands as a whole.

2) Just as coal management is but one component of the larger issue of public lands management, so is coal leasing merely one component of coal management. To lost sight of this fact and let either of these relationships get reversed would be a serious mistake. The upshot of letting coal leasing dominate coal management or coal management dominate land management can only be to prolong the time it takes to get a workable system in place.

3) The primary goal of achieving comprehensive, equitable, and environmentally sound management of the public lands, and therefore of coal as well, cannot itself be achieved by the time of the 1980 Presidential election. This can occur only with the writing and implementation of new land use plans based on those principles. However, we are convinced that a system for achieving that goal can be firmly in place by then. This can happen, though, only if the Department is willing to take the necessary time and effort on the next year to develop such an acceptable land management program. Operating on a politically-motivated timetable is sure to be self-defeating, for Interior as well as for the coal industry and the public.

Previous attempts to develop coal programs have failed because the Department tried to fight against these principles.by bowing to a wrongly-perceived political judgements and by letting coal leasing take precedence over both coal management and land use planning. From the Draft ES and the Department's related actions it appears that the current Administration is falling into the same trap.

There is no reason why the Department should let this happen again.

We therefore suggest that the Department:

-- abandon its objective of holding mid-1980 lease sales and strive instead to have an acceptable system for comprehensive land use planning and coal management in place by then.

-- fundamentally re-examine the question of the need for leasing.

-- initiate further leasing, when it is shown to be necessary, only on the basis of a new planning system in accordance with FLPMA and only according to land use plans developed under that system.

After all, traditionally, federal coal policy hasn't been that different from federal water policy in that both were unsound boondoggles. But the Carter Administration was courageous enough to fundamentally revise federal water policy, bringing it in step with the ecologic and economic realities of the present. The effort was successful. Now is the time for the Administration to similarly revise federal coal- and land-management policy. Congress, through FLPMA and the Federal Coal Leasing Amendments Act, has cleared the way for the Department to take the necessary steps. Now it is only a matter of your will to do so. We look forward to being active partners in that endeavor.

II. NEED FOR ADDITIONAL FEDERAL COAL LEASING

At the Denver hearing we presented a brief analysis of the discussion of need for further leasing which is found in the ES. Our conclusion was that the ES's discussion of need was grossly inaccurate and unrealistic, and that a reasonable analysis of the subject would require a fundamental revision of the study's assumptions. We will here flesh out our critique in greater detail for the Department's benefit, but caution to add that these comments can only begin to touch upon the problems which the ES's analysis of need contains.

A. With apparently the exception of the "no new leasing" alternative, all projections in the ES of coal demand and supply are based on the full availability of Western coal. Section 2.7; M.2.1.1C. Thus, the forecasts assume the answer to the question they're asking. This circularity is obviously inappropriate. An analysis of need based on it only tells us that, yes, you need to lease more coal when you assume that more coal will be leased. It is not surprising, then, that the ES concludes we need to lease. This was the assumption that the Department started with! This fact in itself is enough to invalidate the entire analysis of need.

B. The entire field of possible environmental constraints on coal production is omitted in the ES's analysis of need. The DOE model is presently unable to deal with this most important variable. The only "environmental cost" which it considers is the effect which flue gas desulfurization has on the price of coal. The model is not equipped to deal with actual physical or environmental constraints on coal production. It assumes the total subservience of environmental considerations to the economics of "least cost" coal production. By doing so, the model assumes that national sacrifice areas will exist, and indeed, the ES gives no indication that this will not be allowed to occur as a result of future Departmental decisions.

Not only does the DOE model fail to take seriously the effect of environmental constraints on coal production, but the remainder of the Department's analysis perpetuates this error, as well. We are even told explicitly that it is a "general methodological assumption" (p. 5-1)of the study that environmental conflicts between coal development and other resources do not exist: "Development of other resources in the Federal coal regions will not significantly interfere with coal development under the Federal coal management program." (p. 5-3).

This assumption of no environmental conflicts is transparently fallacious. If coal development will not "significantly interfere" with the development of other resources (wildlife, wilderness, scenic and aesthetic values, watershed, agriculture), then there is no need to write an EIS on any phase of coal development since there would never be any actions associated with coal mining which would significantly affect the quality of the human environment. Such an assumption turns the world on its head and in the bargain makes a liar out of Judge Pratt, whose Memorandum Opinion in NRDC v. Hughes stated: "The environmental consequences of any national coal leasing program cannot be gainsaid...." The ES's analysis of need for leasing, though, attempts to do precisely that.

This results in a most curious schizophrenic attitude within the Draft. We learn in one section of the ES that there are no multiple use conflicts arising from coal development and that this factor can be ignored in assessing future levels of coal supply and demand, while in other parts of the document Interior gives us an information overload of the environmental effects of coal with table upon table of "residuals". But the two apparently have no relationship to each other and the ES is far from clear concerning how it will use the mass of numbers which it has generated. Because of this, even though the ES says that severe water shortages will occur in many Western coal regions even without additional coal development (p. 5-41, 44, 47), we are supposed to believe that

greatly expanded mining will not be hampered by this fact and that it will not affect the cost of coal coming from the region, thereby shifting production to regions which do not have this problem (such as the East). In this example, the necessary water will come from somewhere without any environmental or economic cost, or delay. To put it mildly, this scenario - which is typical of the ES's treatment of all environmental values and resources - defies belief.

C. A further assumption of the ES is that "Labor, equipment, and capital shortages will not significantly distort the projected levels or timing of the Federal coal management program." (p. 5-3). In other words, none of these factors will inhibit the doubling of coal production by 1985, which is President Carter's stated goal and one of the goals of the preferred alternative.

Common sense, the industry, and the General Accounting Office all disagree with this blithe assumption. For example, on June 9, 1977, the Wall Street Journal ran a front-page story entitled "Increasing Use of Coal as President Proposes Faces Myriad Problems; Among Them: Mine Capital, Pollution, Transportation, and Industry's Resistance." The article began: "At first, President Carter's plan to increase coal use significantly by 1985 seemed difficult. On closer scrutiny, it looks almost impossible." Once again, it is typical that everyone recognizes real-world constraints on the demand and supply of coal except the Department.

The ES's assumption that coal transportation will not be a problem stands in stark contrast to statements of industry spokesmen. Burlington Northern Chairman Louis Menk has stated that his company, a leading transporter of coal, is "critically short of cars and locomotives", and Randall Meyer, President of EXXON Co. USA, has stated that "The limitation (on producing Western coal) is getting coal trains in and out of there." Wall Street Journal, February 15, 1978, p. 31.

Exacerbating this problem, of course, is the huge quantities of capital which will be required to build up the railroads' coal hauling capabilities to handle and move a six-fold increase in Western coal production over the time period 1976-1990. According to the ES, during that time period, coal movement by railroad will increase at an even faster rate: from 110 billion ton-miles in 1976 to 892 billion ton-miles in 1990 (p. 5-109). Will this staggering increase cause any financing or equipment problems? "No," says the ES analysis of supply and demand levels; "Yes," say other portions of the ES and the railroad industry itself (p. 5-109 to 113). The most conservative estimate in the ES is that the industry will require $17 billion just to make capital improvements for/coal traffic alone (p. 5-113). This will not be easy

chore for an industry whose financial strength is called "anemic" and which has a rate of return on equity investment of 2%.

Since coal transportation costs are one of the variables included in the DOE model, it is instructive to see how / the model's assumptions correspond to the real situation in the industry. First of all, we see that the mid-range figures are based on 1977 ICC rates escaled at an inflation rate of 5.5%. One does not need to be an economist to know that our present inflation rates are significantly higher, and that by 1990 the difference between the two could have an appreciable effect on coal movement which, of course, if not reflected in the DOE model as presently iterated. Furthermore, those 1977 rates are, according to the railroad industry, grossly inadequate to finance the capital expansion which they need. In early 1978, for example, Burlington Northern and Southern Pacific applied to the ICC for permission to raise their coal haulage rates 52% on the Wyoming to San Antonio run. They argued that they needed the rate increase to be able to raise capital, but opponents said that such a boost would have a serious effect on efforts to increase coal production because it would wipe out the competitive advantage of coal relative to other fuels. Wall Street Journal, May 16, 1978, p. 17. The ES nowhere analyzes this argument, probably because it uses even older rates. The DOE model should be recalibrated accordingly. Of course, even this will not solve the more basic problem that the model and the ES's analysis of need in general have not dealt with the issue of equipment shortages and timing problems of building enough cars, locomotives, and additional lines to increase coal haulage by some 800M by 1990.

The ES's estimates of the capital needs of the railroad industry to expand Western capacity, however, pale beside those of the coal industry itself. A US Bureau of Mines study, for example, is quoted in the Wall Street Journal as estimating that even to reach 988 million tons per year by 1985 (approximately equal to the "low scenario") would require a capital investment of $45.5 billion. It would also demand the training of 31,000 new miners. Wall Street Journal, September 26, 1977, p. 28. This is an incredibly difficult bill to fill in the next six years. No wonder, then, that the General Accounting Office concluded that doubling coal production to 1.2 billion tons by 1985 is impossible, and that reaching even one billion tons would be very difficult. Id.

Yet, the Draft ES assumes that achieving the higher of the two levels will entail no significant labor, capital, or equipment problems. It merely assumes these "myriad problems" out of existence.

The result of these factually and logically bankrupt assumptions, and of others which we have not discussed here, is a consistent and gross underestimation of the barriers to coal development. This in turn leads to projections of coal development which greatly inflate the expected levels of supply and demand, thereby serving to "justify" additional coal leasing. From just the foregoing it is clear that DOI has failed to establish a real and pressing need for leasing. But we do not need to rely only on the assumptions underlying the analysis in order to discredit it, for the actual results of the analysis itself are subject to attack. Indeed, the work of independent forecasters shows that the ES estimates of supply and demand are all high by an order of magnitude in that the ES "low" and "medium" scenarios should more properly be the medium and high scenarios, respectively.

The Report of the National Coal Policy Project, for example, lists these three estimates of 1985 coal production (pp. 159-160):

ERDA (1975)	863-1066 million tons
Workshop on Alternative Energy Strategies	726-944 million tons
US Department of Commerce	776 million tons

The mid-point for each of these estimates (964 MTPY for ERDA, 835 MTPY for WAES) is either at or below the ES "low" scenario of 970 MTPY for 1985. The Bureau of Mines and GAO reports quoted above also confirm that the "low" 1985 scenario is the one most likely to be reached, and that the "medium" is unattainable. Similarly, a 1977 Office of Technology Assessment report on the National Energy Plan stated that "the levels of domestic supply projected in the Plan represent the upper limits of capacity, and supplies of all fuels are likely to fall below the Plan's production targets." (p. 3). Since the ES "medium" and "high" scenarios approximate the REF projection of coal use and therefore represent the "upper limit of capacity", a figure on the order of 1.7 to 1.9 billion tons should more reasonably be used as the "high" projection. Adjusting the other scenarios accordingly would certainly give a more realistic idea of the ballpark numbers which we should be dealing with.

Making the 1985 "low" scenario the "medium" one would also have an impact on the 1990 numbers. If in fact production is likely to rise "only" to the level of 970 million tons in 1985 from 700 million tons in 1975, it seems reasonable to expect that 1990 production would be more on the order of 1.2 billion tons, rather than 1.5 as the preferred alternative currently envisions. This revision,

of course, cannot take the place of a detailed reworking of the DOE numbers which is obviously called for, but it does suggest what reasonable ranges would be. It appears that the Department lost sight of this perspective upon exposure to the marvelous DOE computer. Common sense, however, dictates that the "medium" scenario should not represent the "upper limit of capacity" in view of the many studies which have found that it will be impossible to reach such a level. Instead, the "medium" scenario should be the one most likely to develop. That presently is not the case with the ES analysis of need.

Tables 5-2 and 5-3 present yet another startling insight into the ES's analysis. Chapter 2 gives the impression that if federal leasing is not undertaken soon production will fall substantially short of the 1990 "needs" - "Achievement of medium and high 1990 production levels would require extensive development of new sources of western coal production....New federal leasing would make a major contribution in achieving such development." (p. 2-47). This statement is flatly contradicted by the information in Chapter 5, which shows that EVEN WITH NO NEW LEASING, NATIONAL PRODUCTION WILL BE SUFFICIENT TO MEET THE GOALS OF THE PREFERRED ALTERNATIVE MEDIUM SCENARIO FOR 1990! The primary difference between the no new leasing alternative and the preferred alternative for 1990 is that coal production would be more evenly distributed around the nation. 100 million fewer tons would come out of the Powder River region which would be hit incredibly hard under the "no new leasing" alternative anyway, its production rising from 37 million tons in '77 to 305 million tons in '90. But this would result in no national shortfall even if the 1990 "need" was 1.5 billion tons, which seems impossibly high.

Having thus failed to demonstrate an actual need for coal leasing, the Department next tries to justify the institution of a leasing program by using other extraneous arguments which have no relationship whatsoever to the amount of coal already under lease. These arguments are that leasing will

1) promote more desirable patterns of coal development;
2) increase competition in the coal industry; and
3) be necessary anyway to process PRLAs.

These all attempt to establish reasons for leasing, rather than speaking to the need for leasing. There is a big difference between the two, and absent convincing proof of need, these arguments amount to little more than rationalizations and excuses for what Interior really wants to do - lease. Rationalizations, even if they are somewhat persuasive (which these are not), are an inadequate and inappropriate basis on which to make major public policy decisions. The Act

must not and will not be subjected to the impacts of a federal leasing program on the basis of DOI rationalizations.

Interior argues that leasing should be resumed because it "offers significant legal and administrative advantages" for themselves (p. 2-43). The details of this admittedly self-serving argument are contained in total in three paragraphs of the ES (p. 2-49). Grabbing at straws, the Department tries to make a case that it needs a full-scale leasing program in order to issue PRLA's. If that is so, then why is there a separate alternative in the ES devoted/processing PRLAs? If a full scale leasing program really is needed to process and issue PRLAs, then there could be no separate alternative which would accomplish the same thing.

The other two supposed reasons for renewed leasing cannot withstand scrutiny, either. The argument that leasing is needed to improve patterns of development assumes that Interior knows what patterns it wants to encourage. The ES gives no indication that Interior has any such knowledge. Without this, DOI cannot begin to know the extent of the supposed problem which it is trying to solve. Nor is it clear that to if the Department knew what constituted an "improved pattern of development", that leasing is the only, or the most desirable, way to achieve that goal.

Numerous options other than leasing exist if DOI truly wants to direct development. It could purchase leases, designate them unsuitable for mining, formulate land use plans which would prohibit development after certain thresholds are reached, use its powers to deny access to applicants, redesignate air quality regions, aggressively pursue PSD reviews, deny mining plans, designate wilderness areas and areas of critical environmental concern, and aggressively exercise its trust responsibilities toward Indian tribes. The list goes on and on. The telling point, however, is that Interior's discussion of the ways to promote desirable development totally ignores means such as these to control unwanted development. Rather, it concentrates on issuing more leases so that it can "control" development on those leases while the uncontrolled development continues to be uncontrolled. This doesn't make much sense.

Similarly, the argument falters that leasing is necessary to increase competition. It is not even clearly established that/competition is a major problem in the coal industry. But if this were a concern of the government, here again, it has numerous means at its disposal by which to resolve the problem. It could, for instance, pursue vertical or horizontal divestiture, prohibit mergers of a certain sort, use the powers established in Section 501 of FLPMA

lack of

to deny rights-of-way which would give applicants unfair competitive advantages, make the Justice Department's antitrust review of lease renewals and readjustments mean something rather than the pro forma treatment they're given now (see Section 15 of the Federal Coal Leasing Amendments Act of 1976), enforce the provision of the Mineral Leasing Act which bars common carrier railroads from obtaining federal leases, and conduct an aggressive antitrust review when lease assignments arise. Measures such as these would appear to be much more effective means of promoting competition than leasing. As described in the ES, the Interior approach to antitrust if applied, for example, to the steel industry, would not be to break up the giants which are the cause of the problem. Rather it would be to make additional lucrative contracts available to them.

If the Department is serious about making any of these extraneous arguments, it must at a minimum perform a rigorous examination of alternative means to achieve those goals and include that analysis in the Final ES.

In addition, the Department must fundamentally re-do its analysis of need by correcting the errors noted above as well as those identified by others. This is essential for making an accurate determination of the need for leasing on a programmatic level. It is not sufficient to correct these defects during the preparation of the regional statements envisioned under the preferred alternative. It must be done now. Failure to fundamentally restructure the ES's analysis of need will jeopardize not just the present statement, but also the future Regional ESs which will share the same assumptions as the programmatic (p. S-3). Interior simply cannot make a reasonable determination of need based on the untenable assumptions which the ES puts forth. It must also critically examine projections of coal development done by other responsible parties and clearly state how they relate to the figures in the ES and the reasons for the difference. The determination of need is too important an issue to be decided on the basis of only one projection when many more are available.

III. MANAGEMENT OF EXISTING LEASES

Despite the title of the proposed program, the "Federal Coal Management Program", the concept of management of federal coal lands - as opposed to the leasing of federal coal lands - has been given short shrift in the ES. The major emphasis of the program should rightfully be the management of existing coal leases because of the huge acreages of federal land currently

under lease. The Department is well aware of the distinction regarding the production capability of its leased lands, and we will not repeat them here. But to date the Department still has not faced up to its responsibilities to administer these lands. The treatment of the subject in four paragraphs of the ES (p. V-5 to 6) would be laughable were it not such a serious and continuing problem. Although the development of existing leases can easily cause equal or greater environmental impacts as compared to leases issued under a new program, DOI has shown no initiative to develop the desperately needed means to control the timing and distribution of coal development on those leases.

The extent to which the program described in the ES is a leasing rather than a management program is easily seen by examining the alternatives put forth in the statement. The ES lists six formal alternatives to the preferred program. The six are "alternatives" only in so far as they concern the types of leases to be issued or the identity of the party who determines leasing levels. The six are: no leasing, lease PRLAs only, lease only "emergency leases", lease to satisfy industry, lease to satisfy states, and lease to satisfy DOE. The only alternatives found in the ES are leasing alternatives. In addition to those six, Chapter 5 identifies eight "subalternatives among policy issues." Here, three of the eight are applicable to existing leases, but all are statutorily required. The question for them is not whether they should be applied, but how they should be applied. The options for defining maximum economic recovery and due diligence are fairly closely circumscribed by law; formulating and applying a general lands program is more open ended. But there Interior is careful to note that the application of many of the criteria to existing leases is discretionary on the part of the Secretary. Furthermore, those criteria are being applied now without public participation and they were formulated without public participation. Also, among the subalternatives, the lands unsuitability criteria alone have no alternative measures proposed for them. All of this adds up to the conclusion that the Department is not interested in using the EIS to develop a management plan nearly as much as a leasing plan. Existing leases are treated only to the extent that legislation requires (sometimes not even then) and only so far as they affect leasing decisions.

For example, the ES fails to describe the relationship between coal management in general and other major mineral programs which are affected when and the subsequent inventory. There is no discussion of areas of relative

environmental concern and how differing interpretations of that concept could affect existing leases. Perhaps most importantly, the ES utterly fails to describe or analyze possible mechanisms for controlling development on existing leases. The notion of threshold limits is left in a conceptual state and the ES gives no indication as to what the upper limits of environmental degradation for a region might be. As noted above, the ES implicitly condones national sacrifice areas, even though they would certainly be inconsistent with the mandate of FLPMA which directs BLM to manage the public lands on the basis of multiple-use, meaning: "...a combination of balanced and diverse resource uses...and balanced and harmonious management of the various resources without permanent impairment to the productivity of the land...." Section 103(c). In addition, the ES treats development up to the level of the "no new leasing" alternative as inevitable, and seems to suggest that virtually all mine plans on existing leases will be found acceptable.

Obviously, the program described in the ES is designed only to address a very limited component of coal management - that of coal leasing. In the ES's own words: "The preferred program is designed as a start-to finish... system of federal coal management of new competitively-sold coal leases." (p. S-28)(emphasis added). Its purpose is not to manage existing leases.

This is seen most clearly, perhaps, in the Department's attempt to continue coal management on the basis of existing management Framework Plans. According to Section 3.2.8 of the ES and the recently-proposed regulations to implement the land use/provisions of FLPMA, existing MFPs would continue planning in effect for up to 15 years from now. In a sizeable portion of the coal regions, MFPs were revised in 1977 or thereabouts to implement the old EMARS coal program which, of course, the court has now found to be invalid. Yet Interior proposes to let these plans stand despite recognized data inadequacies and the order of the court.

Such a strategy is incredible when the Department itself has expressly recognized that many of the criticisms of the MFPs are true. An interagency task force of the Department recently stated the MFP system

> involves case-by-case balancing of coal development values, either subjectively or empirically, with other use values in order to maximize overall economic values obtained from public lands. Other use tradeoffs can easily reflect mainly local values, or values of local BLM personnel. These values can also differ substantially from the priorities of the country

> as a whole. In addition, they are not likely to be consistent from one area to another. Under existing BLM planning system procedures, it is very difficult to know how land-use tradeoffs are made, because the values placed in decisionmaking are almost always left implicit. The BLM has tended to view this feature as a virtue worth paying in order to gain the advantages of wide local discretion to deal with widely varying individual circumstances at the local level. (Final Report Coal Task Force 2, Land Unsuitability Criteria, September 11, 1979, p. 12)

Many of these inadequacies are expressly dealt with in the BLM Organic Act and prohibited by that Act. For example, the Act states that management of the public lands shall be on the basis of multiple use/sustained yield and "not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." Sec. 103(c). The Act also stresses uniform and comprehensive procedures for the administration of the public lands, which the MFP system, by the Bureau's own admission, cannot provide. Finally, the Organic Act calls for effective public participation in the land use planning process. For this to happen, the values employed in decisionmaking must be made explicit, rather than left implicit, as with MFPs. But despite these conflicts between the statute and the Bureau's planning system, Interior intends to keep using the MFP process as the basis for its new coal management program, at least for several years.

This procedure is both unacceptable and uncalled for. It would be far superior, for reasons which we outlined in Part One of these comments, for the Department to instead set the new planning system under FLPMA in place before major coal management decisions are made. This would mean a rejection of the "special start-up considerations."

We would also hope to see in the Final ES an extensive discussion of a true management program, together with alternatives for that program.

IV. LANDS UNSUITABILITY CRITERIA

Since others will be dealing in detail with the lands unsuitability criteria, we wish to make only a few pertinent comments:

1) The general exception should be eliminated. The criteria should apply to all lands covered by SMCRA for both surface and underground mines since surface effects could occur anywhere on the lease tract. The exact locations would not be known until a mine plan was submitted, but the criteria are slated to be applied before even issuance of the lease let alone submission

of a mine plan.

2) The criteria should be consistent with the laws under which they are promulgated. This is of particular concern with respect to the criteria which cover endangered species, bald and golden eagles, falcons, and reclamability.

3) The Wilderness Study Area criterion appears to have a number of problems. It would seem that federal lands designated as study areas should be exempted from leasing as well as mining while Congress is considering the designation. Coal leasing in study areas would undoubtedly jeopardize their potential for wilderness designation. This has happened in Colorado under the RARE II process in which coal lands containing leases in the proposed West Elk extension were deleted from the Forest Service's recommended wilderness proposal.

In addition, given the reclaimability estimates in the ES as well as the proposed BLM interim management guidelines for the wilderness inventory, the exception could have the effect of invalidating the criterion itself. Since the Bureau has until 1991 to recommend areas for wilderness status, it is entirely possible that Congress could first designate an area a study area and later consider it for wilderness status per se, meaning that areas could be designated as late as, say, 1997. The interim guidance states that mining may be allowed if the surface is fully restored, or reclaimed within five years after the wilderness designation - or as late as 2002 in this instance. Given the optimistic estimates of reclaimability in the ES, mining in the Green River-Hams Fork area of Colorado could continue up to 1995. A lot of damage could be done between now and then, especially if it were a strip operation, as most in that region are. Thus, the intent of FLPMA could easily be circumvented and the area be declared invalid for preservation if the actual reclamation work were not as successful as originally hoped - which is the likely outcome.

4) Application of the lands unsuitability criteria should be halted. See November 24, 1978 letter from Bruce J. Terris, on behalf of CORC and other organizations to Gary Hicks. Neither Mr. Martin's response nor the December Federal Register notice allay our concerns.

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COMMENTS ON THE
DRAFT ENVIRONMENTAL STATEMENT
FEDERAL COAL MANAGEMENT PROGRAM
BY
NORTHERN PLAINS RESOURCE COUNCIL

061

The Northern Plains Resource Council (NPRC) endorses the objectives of the proposed coal management program as stated under section 3420.0-2 (page A-10) of the example regulations. Coal leasing should take place only pursuant to a comprehensive resource management policy, in compliance with the laws and other safeguards designed to protect society and the environment.

The federal government owns 60% of the western coal reserves, and an additional 20% relies on the availability of complementary federal coal for production. Clearly the actions of the federal government in its management of federal coal will determine the future of several western states. The broad sweeping effects of the proposed coal management program, will affect the lives of millions of westerners for decades to come.

With this in mind, NPRC has examined the proposed program and the draft environmental statement (DES) and has the following critical comments:

1) The statement fails to substantively address serious concerns about reclaimability of western lands.

2) The statement and preferred program rely far too heavily on the Department of Energy's production targets in assessing the need for federal leasing and, in fact, the DES does not demonstrate the need for additional leasing by 1980.

3) The statement undervalues the productive ability of western lands. This in conjunction with the inadequate assessment of reclamation in the West, results in a vast underestimation of the long term loss of productivity and renewable resources.

4) The preferred program carries over the acquisition of surface owner consent until after the lease sale leaving open the potential for a monumental waste of time and money on planning and environmental assessment, and intimidation of landowners by large mining companies.

5) In the rush to meet a mid-1980 target date for lease sales, the Department of Interior is implementing the proposed program prior to receiving any public comment and Secretary's approval, in what amounts to a clear violation of the requirements of the

National Environmental Policy Act.

6) The mid-1980 lease sale target date effectively implements much of the EMARS planning process by necessitating reliance on existing land use plans and industry nominations.

7) A vital component of the preferred program, comprehensive land use planning, is an unknown variable at this point as rule-making pursuant to the Federal Lands Policy and Management Act lags behind the establishment of the management program.

8) The environmental statement does not adequately assess the social and environmental impacts of the proposed program.

9) The preferred program does not adequately provide for consideration of cumulative social and economic impacts of leasing federal coal. The question of how, where and when the coal will be consumed (its end-use) is critical to this consideration.

10) The preferred program should include provisions for denying federal leases to companies or individuals that are in violation of performance standards established under the Surface Mine Control and Reclamation Act of 1977.

11) Proposed regulations for Lands Unsuitability Criteria (We are submitting separate comments on LUC) are, by the Department's admission, geared to meet DOE production targets. We find this objective in formulating LUC to be wholly unacceptable. It violates the legislative mandate of SMCRA and the President's May, 1977, environmental message ordering the Secretary of Interior to lease "only those areas where mining is environmentally acceptable and compatible with other land uses." It even contradicts the requirement in the example regulations (p. A-12, Section 3420.3-1) that regional production targets shall not be considered in establishing the areas acceptable for leasing.

RECLAIMABILITY

The DES paints one of the rosiest pictures of reclamation potential for western lands that we have seen to date. The Northern Great Plains bears the brunt of this specious assessment. Assertions that rangeland in the Northern Great Plains can be reclaimed in 8-10 years and cropland in 5 years (some places as soon as one year) (pp. 5-17, 5-23) fly in the face of existing evidence. Reclamation has yet to be shown successful in Montana. The estimate that (p. 7-8) rangeland can be restored to pre-mining productivities in 5-15 years on the Northern Great Plains is utterly unfounded speculation. Yet on this assumption, DOI proposes to implement a program to lease tens of thousands of acres of federal coal for surface mining in this area.

Attempts to achieve reclamation in Montana have been fraught with problems. High levels of molybdenum from buried spoils have appeared in legumes (i.e. sweet clover) on reclamation plots at Colstrip. Livestock, particularly cattle, can be weakened, sterilized and even die from an imbalance of the element of molybdenum in their diets.

Introduced grasses on strip mined land have failed to demonstrate an economically viable cattle carrying capacity. Experiments by Montana State University researchers showed a lower average weight gain for steers grazed on mined land than for steers on native range. Further, when all of the steers were grazing over the mined land in the fall, those that had summered on native range actually lost an average of .200 pounds per day.

Efforts to reclaim rangeland to a permanent diverse cover of primarily native species, as required by Montana law, have not yet shown success - the jury is still out. No bonds have been released in the state of Montana for strip mine reclamation.

Experiments on reclaiming strip mines to cropland in Montana do not look promising. Applications of 10-20 times as much fertilizer (as ordinarily used in the area) on mined lands failed to produce anywhere near the average yields for the county.

Erosion has created gullies six feet deep on reclamation plots at the Western Energy mine at Colstrip, Montana. The nature of the soil - loose, undifferentiated profile, with poor capacity for holding moisture - makes it highly susceptible, once disturbed, to erosion.

The DES is biased towards western coal. A case in point is the assessment of long term losses of productivity (p. 7-6). It proposes to protect the agriculturally productive Eastern Interior and Western Interior coal regions by leasing federal coal and shifting production to the western U.S. One need only turn the page to discover that reclaiming to cropland in the Eastern Interior coal region could occur as quickly as one to two years. Factors such as annual precipitation, soil composition and demonstrations of successful reclamation in the East and Midwest lend some credence to that statement. Yet, the preferred program would pass over this region in favor of the West where reclamation is still dubious. Very probably, western coal or its products would be marketed in the industrialized and populous Western Interior and Eastern Interior regions. (This is not to advocate increased surface mining in those areas. An adequate determination of need, coupled with an established national policy to encourage deep mining of coal would probably obviate or substantially diminish the need for large increases in surface mining, anywhere. It's merely to illustrate the inconsistencies of the analysis.)

The amount of cropland that would be disturbed in each region is used to determine the loss of agricultural productivity for the purpose of comparing alternatives to the preferred program (p. 7-7). As a result, the farm lands of the East and Midwest significantly outweigh the productive grasslands in the West, which are not included in the comparison. The Powder River region, with 104,000 acres to be mined by 1990 under the preferred program (medium level), according to this assessment would suffer a loss in agricultural productivity of only $48,000 over that period.

The DES unrealistically assumes complete restoration to original productivity of disturbed lands in the Fort Union and Powder River regions by 1990. The statement is made that "all strip mined land is assumed to be potentially reclaimable" (p. 7-6) in assessing the long term environmental consequences of the coal management program.

The material on reclamation and the assumptions on which the environmental assessment is based grossly diminish the validity of the DES.

DOE PRODUCTION TARGETS AND DOI ASSESSMENT OF NEED

The Department of Energy coal projections target the Northern Great Plains (Wyoming, Montana and North Dakota) to become the largest coal producing section of the country by 1990, exceeding both Appalachia and the Midwest. Slight modifications and adjustments by the Department of the Interior do not alter the relative level of coal production to be borne by this area. In fact, DOI's projections for coal production on the Ft. Union and Powder River coal regions combined are actually higher than DOE's, according to the DES (pp. 2-28 - 2-29 and pp. 5-11 - 5-10).

Medium Level Demand Projections - NGP Coal
(Million Tons)

	DOE	DOI Preferred Program
1985	224.6	236.9
1990	416.7	441.9

DOE's coal production targets are based on national macroeconomic variables such as employment and income. The model takes into account effects of other energy sources and environmental regulations, and shifts these assumptions in pre-determined ways to arrive at high, medium, and low levels of coal demand.

One of DOE's assumptions is high availability of cheap western coal through the leasing of federal coal reserves. Ironically, DOI turns around and uses this model to demonstrate the need for leasing huge amounts of western coal.

The model assumes commercial production (7-27 full size plants) of synthetic natural gas (SNG) from coal by 1985, the chances of which are nil. At the most there might be one plant (American Natural Resources in Mercer County, North Dakota), which at this point looks doubtful. This is particularly pertinent to western coal demand where the projections assume a viable and thriving SNG industry by 1985. Technological and economic problems with SNG indicate there is small likelihood of large scale SNG production before 1995 (if ever) with or without federal leasing.

There is no evidence that DOE's modeling has been tested by a technique known as "backcasting" to assure its reliability. Further, it assumes an energy future which is like the past, only the numbers are higher. Such an assumption is increasingly discredited by energy planners and forecasters.

End-use modeling, which is already being employed in several states (among them Arkansas, Oregon, and California), is only cursorily mentioned in the DES. The technique deserves serious and immediate attention by DOE and DOI. It provides by far the most accountable and responsive forecasts of future energy demands, which is particularly important in light of the rapidly changing energy outlook in the United States and a changing national energy policy emphasizing conservation.

The DOE econometric model inherently favors surface mineable western coal as the least costly alternative. Environmental and social considerations are given no standing, except insofar as these may affect the economics of energy production. Other costs, particularly those that are not accrued by the mining companies, such as long term losses of productivity on mined land, are not considered in the model.

A May, 1978, study by the Montana Energy and MHD Research and Development Institute estimates total Montana coal production to meet both in-state and out-of-state market demands will be 40-45 million tons per year in 1985. This amounts to approximately one-half the 1985 medium level production figure for Montana in the preferred program - 87.1 million tons per year. It is also well below the 65.3 million tons per year projected in DOI's no-new-leasing, medium-level production scenario.

Finally, the DOE model assumes mine-mouth conversion for western coal, deceptively indicating a large western market for coal. Much of that energy will be exported in the form of electricity (and possibly SNG) to other regions of the country for actual consumption. Defining coal converted in the West as coal consumed in the West is misleading and biases the conclusions of whether and where to lease federal coal towards western regions.

SURFACE OWNER CONSENT

Only 44% of the total federal coal acreage has federal surface ownership as well. Consequently, the role of the private surface owner is critically important in the Department's planning process.

The preferred program proposes that surface owners be consulted during the land use planning process. This is the appropriate stage to consider surface owners' wishes. If at that point surface owners indicate a definite preference against the leasing of deposits beneath their surface, the land should be removed from further consideration for leasing.

Allowing the land manager to screen such lands at his option and proceed to continue a tract without consent "if it is considered important," (p. 3-25) will contribute to a monumental waste of time and money.

It is intolerable that the surface owner who has stated a definite objection to the leasing of his subsurface minerals should see that land leased by the Department of Interior. Such an action is bound to result in exorbitant pressure on the landowner.

The Department of Interior will have spent months, possibly years, in comprehensive planning and compiling environmental assessments, only to see the tract sale voided when a staunch surface owner will not capitulate on a key tract. The situation lends itself to conflict, confrontation and trouble for all parties.

We strongly adhere to the position that once a surface owner has indicated he will not consent to mining, that land be screened from further activity planning.

SOCIAL AND ECONOMIC IMPACTS AND MITIGATION

The DES fails to substantively address the problems of socio-economic impacts of leasing federal coal, and the preferred program avoids establishing any guidelines or specific requirements to include these effects in decision-making.

The DES shows a complete misconception of the nature of the disruption in statements like: "While the change offers long-term opportunities for the communities in question, short-term distress has too often been the more visible result." (p. 6-4) The long-term benefits of extraction of a nonrenewable resource, particularly by strip mining in an area where reclamation is dubious, will very likely be the "bust" of unemployment and poverty.

The DES goes so far as to cheerfully suggest a public relations effort (top of p. 6-5), in coordination with the few who enjoy an economic boon with industrialization, as a mitigation measure.

Since much of the federal coal lies in rural, agricultural areas, the introduction of coal mining will radically alter the character and economy of the communities. State and local governments, and the public, should be involved in determining levels of leasing. Guidelines or standards on levels of social and economic impacts that can be borne in an area should be developed.

The concept of threshold limits, which is given short shrift in the DES (p. 3-21), is vital. Without this, some areas and communities (e.g. Gillette and Colstrip) will carry an exorbitant burden in meeting production targets because of the existing establishment of a mining industry. Thresholds should serve to deflect exorbitant levels of industrialization in a specific area. Not only the effects of leasing a proposed tract, but also the effects of existing mining and industrialization should be a factor to consider in judging whether to lease further.

Powder River Basin Resource Council
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23 January 1978

COMMENTS REGARDING THE DETERMINATION OF NEED AS SET FORTH IN THE DRAFT ENVIRONMENTAL STATEMENT, FEDERAL COAL MANAGEMENT PROGRAM

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The Draft Environmental Statement for the proposed Federal Coal Management Program gives four reasons in support of an alleged need for renewed federal coal leasing. Only one of these reasons sets forth an actual need to develop coal resources; the remaining three are matters of policy.

1. Leasing to Meet National Energy Objectives. During development of the DES, we were assured that projections of coal production supplied by the Department of Energy would be scrutinized and modified by the Department of Interior. We see little evidence of such scrutiny in the DES or the Memorandum of Understanding between the Secretaries of the respective Departments as described in Appendix B of the DES. While we realize that production targets may be modified in the face of environmental constraints, it is poor policy to think in terms of meeting production goals set unreasonably high by a production-oriented agency; in such a situation, failure to meet goals will be percieved as the fault of too many environmental regulations rather than a more realistic assessment of what was needed in the first place.

2. Leasing to Promote More Desirable Patterns of Coal Development. There seems to be an assumption in this section that because land is in the public domain, it was undesirable to homesteaders and others interested in making a living for themselves on the Western frontier. While this may have been true in the economy of the early West, much of the land over federal minerals in eastern Wyoming now supports viable ranching operations; moreover, this land is no less precious to those who live on it than land anywhere else in the

United States. What is described as a desirable pattern of coal development is, for all practical purposes, a designation of the Powder River Coal Region as a "national sacrifice area". If the higher projections for the Powder River Region are actually realized, offsite environmental and socioeconomic impacts will make it impossible for ranching operations to continue in Campbell County. The combined effects of fugitive dust, water consumption, fragmentation of range from electricity and rail lines, and competition for labor and credit will put the ranchers out of business -- or take away their desire to continue trying.

There is also a statement in this section to the effect that because of the thickness of the Powder River coal seams, only one acre of land will have to be reclaimed per given quantity of coal, as compared to 5 acres in the East. This statement implies that it is, therefore, more efficient to mine Powder River coal. What this statement ignores is the fact that it is much harder to reclaim that one acre due to minimal rainfall and and other adverse conditions, especially wind, whereas in the East this reclamation might be accomplished much more expediently.

3. Leasing for Legal and Administrative Purposes. We agree that the Department should have the flexibility to offer new leases to holders of PRLAs situated in areas obviously unsuitable for coal mining. However, a new federal leasing program can be limited to just that purpose, rather than encouraging additional development of federal coal reserves.

4. Leasing to Increase Competition in the Coal Industry. It seems almost humorous to talk about competition in the Western coal industry when nearly all of the mining operations are owned and operated by multinational energy corporations. "New" companies are not presently prevented from entering the market, because, as the DES points out, they can buy existing leases and PRLAs from their present holders. In any case, transportation of Western coal to its ultimate customers is handled through a regulated, monopolistic rail system, so the notion of a "private market functioning in the most socially beneficial manner" (page 2-49), i.e., the best product at the least cost, is essentially a myth. Within any one area such as the Powder River Coal Region, the costs of production from one mine to another will be pretty much the same, and the freight costs will even out the rest.

Further Miscellaneous Comments:

One thing that is particularly disturbing about DOI's reliance on DOE's production projections is the fact that these projects are based on a set of assumptions which do not include conservation measures. This is a serious omission in light of the emphasis which will be placed on conservation in the National Energy Plan II, and also when considering that we have now arrived at a level of scientific expertise which shows us that we are inexcusably wasting most of our non-renewable energy resources. It is awful enough to think of the environmental and socioeconomic effects that increased mining activity will have on the Powder River Basin; it is even worse to think that perhaps all that activity wasn't even necessary.

Earlier, the lack of DOI analysis of DOE production targets was criticized. Perhaps one way to deal with this problem would be to allow certain avenues of public input into the target-setting process. Presently, there is no opportunity for the public to study and comment on production targets during the formulating stages. A mechanism to solicit and evaluate public input on this phase of the coal management process would provide a different perspective and make the final determination more reflective of real needs.

Finally, DOI relies on one sort of model, an econometric model, to assess the demand for coal production. There are other kinds of models, particularly end-use models, which generally produce different determinations. There is no examination in this DES of the different models and the merits of each. We feel that such an examination should be carried out in the DES, because the federal coal management program hinges on the demand for coal. If there are different ways to assess that demand, then the public has a right to know about and to evaluate those ways.

In conclusion, I would like to state that we believe that a coal management program is necessary. However, we also believe that "coal management" is not synonymous with "coal leasing". The Powder River Coal Region is already suffering severely from the environmental and socioeconomic impacts of existing mining operations. If DOI plans to exacerbate that situation through additional federal coal leasing, then it must take responsibility for the cumulative effects as part of its management program.

Again, accurate determination of need is critical to the residents of the Powder River Coal Region, who will be the most severely affected by the implementation of this program, even in a scaled-down form. Therefore, we have to know that when additional coal leasing takes place in the Powder River Basin, it will be predicated on the most realistic assessment of demand and that all reasonable alternatives for meeting that demand have been exhausted.

submitted by: SARAH GORIN
for the POWDER RIVER BASIN RESOURCE COUNCIL.

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February 12, 1979 1792 (142)

Office of Coal Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Sir:

These comments are submitted by Coastal States Energy Company in response to the Draft Environmental Statement for the Federal Coal Management Program. Coastal States Energy Company, a subsidiary of Coastal States Gas Corporation, owns and operates the Southern Utah Fuel Company Mine near Salina, Utah. In recent years the Southern Utah Fuel Company Mine has become the largest single underground coal mine west of the Mississippi. Last year the mine produced 1 1/2 million tons of coal, all from federal leases and all from a single production portal.

We have reviewed the Draft Environmental Statement and find it to be generally well written and thorough. We recognize the difficulty in assessing a "Program" rather than a clearly defined project. We believe it adequately covers the issues, that it needs only minor changes and that those who are responsible for drafting the statement are to be commended. We do have some serious problems with the federal coal management program but these problems are not so much with the statement itself as it is with the complex system of laws, regulations and court decisions within which the drafters of the statement were forced to operate. These problems are discussed in more detail later herein.

Recently, Coastal States successfully bid on a federal coal lease covering lands immediately adjacent to our SUFCo mine and so we are well aware of the problems, difficulties and delays with respect to leasing federal coal and have based our comments on our experiences.

The mining of this new lease from our existing operation would require no new portals, no new surface facilities and no new transportation systems. There was no environmental, political or administrative controversy regarding our specific application. In fact, there was widespread support. Since this is an underground mine, we did not have to address the national concern over strip mining. We had no issues involving preference right lease applications as this was an application for a competitive sale under the so-called short

term criteria. We were not guilty of holding huge amounts of federal acreage for speculation. We were not faced with obtaining permits for starting up a new mine. The mine was already operating and had been for more than 30 years. It does need additional reserves in order to maximize recovery of the total reserve, to replace depleted reserves, to maintain employment, to provide optimum utilization of existing facilities, to satisfy an increasing demand for our low-sulfur coal and for overall sound management of a growing operation constrained within lease boundaries largely unrelated to the geology of the area.

Even though the lease sale had widespread support, it required more than four years of effort from the date of the application to bring this tract to sale. Finally, the lease sale was held; we bid and won. After nearly three more months our lease was issued with an effective date of January 1, 1979, just 51 months following the date of our application. Presently we still cannot mine this tract because the Office of Surface Mining has not approved our mine plan. We do hope that it does not take several months more to obtain approval to begin mining.

The cause of our frustration is readily apparent. During the four years to bring this application to lease sale, we made numerous visits and telephone calls to various governmental officials. Many were concerned and helpful, especially those in Utah. But it seems that those who are dedicated are hamstrung by an unwieldy, nearly unworkable system.

What obstacles hinder the dedicated governmental worker and what creates the nearly unworkable system which we now have? We believe it is the vast array of new laws and regulations which are amended and revised even before they are clearly understood and implemented. The question then becomes how can we deal with these new laws and regulations to make a better system.

We would like to have seen considered as serious national policy options, such alternatives as seeking repeal or at least clarification of much of the environmental legislation of the past ten years and also consideration of a policy that eventually would convey ownership of all federal coal into private hands. There has been much made over the "fact," the accuracy and meaning of which is still in dispute, that a disproportionate amount of federal coal is under lease relative to the amount produced from federal lands. Further, that speculation is rampant and that industry is withholding federal coal from market for self-serving reasons. This line of reasoning usually arrives at the conclusion that consequently there is no need for any additional federal leasing in the forseeable future.

We believe this to be a gross misinterpretation of the situation and that the conclusion is in error. To us, the fact that 93.5% of national coal production in 1977 came from non-federal lands does not suggest we discontinue federal leasing. Instead, it strongly suggests that in order to increase production from Federal lands, the lands should be under non-federal control. Leasing is at least a step in that direction and the fact that only 791,000 acres are under lease of the 11.5 million federal acres within Known Recoverable Coal

Resource Areas, which in turn is only a small part of the approximately 100 million acres of coal rights owned by the federal government, borders on the criminal for a nation hungry for domestic energy supplies. Just imagine the furor if a private corporation held such dominant control of a resource and similarly refused to allow it to be developed! And regarding speculation, we can think of no better way to encourage speculation than to withhold the major portion of a resource from the market--that is certain to drive up the price of remaining available lands.

We believe that coal leasing in and of itself is not a major federal action, causes no environmental effects whatsoever, and therefore should not be the subject of an ongoing national debate. The many new laws, if they accomplish anything at all, certainly insure that any new mining proposal which survives all that maze of red tape, permits and requirements and is lucky enough to someday become an operating mine, is going to have a minimum amount of adverse environmental impact. Accordingly, it appears that a federal coal lease has long since ceased to convey the full right to mine coal. Rather, it is merely one of the first of a long series of requirements and by itself carries no environmental impact.

It is heartening to see that under all the various alternatives analyzed and discussed, coal mining and coal usage will increase. The Environmental Statement discusses the laws and regulation which will mitigate the environmental effects of increased coal leasing and mining if such occurs. We believe that coal production can increase and be carried on in an environmentally acceptably manner.

The American public needs increased coal production, carried out in an environmentally acceptable manner at the lowest cost possible. We believe this lowest cost is obtainable only in a competitive market system. Much of the increased coal production must come from federally owned coal deposits. If this new program does lease federal coal, even more coal than is needed, and allows this newly leased coal to be mined, adequate production levels will be maintained. If not enough coal is leased, other marginal deposits such as in private coal areas will be developed to help make up the shortage--possibly at greater cost, including environmental ones.

If sufficient coal is leased and a rational system of permit approval evolves, coal production will be increased as markets develop. Increased coal production means more jobs especially in economically depressed areas. For example, in Sevier County, Utah, since 1974, while expanding our Southern Utah Fuel Company operation, the per capita personal income increased from $3,600 to $5,500, an increase of 53 percent. During that same period, employment at our mine increased from 28 to more than 200. Taking into account the multiplier effect of primary jobs, which we understand is at least 5 to 1, i.e., 5 additional jobs for each primary job, total jobs provided are about 1000. Compare that to Sevier County's closest neighbor in which there are no mining jobs available. In Sanpete County, Utah, during the same period, the per capita income went up from $3,400 to only $3,900, an increase of only 15 percent. This is an example of the positive effects of coal development which the Environmental Statement tends to ignore.

One of the primary objectives stated by the Department of the Interior in announcing its intention to prepare a new Environmental Impact Statement for the Federal Coal Leasing Program last year was to develop such a document which would be legally defensible not only in terms of general NEPA requirements, but specifically to meet the objections to the earlier version of such a statement listed by Judge Pratt in the NRDC v. Hughes decision. This Statement would certainly seem to have met that objective very well and it is difficult to imagine how a successful suit could again be brought against the adequacy of the programmatic impact statement.

Unfortunately, the Statement would also seek to establish a leasing program which would exaggerate and institutionalize many of the unnecessary delays and frustrations which have characterized the abortive efforts over the past several years to establish and administer a similar program. Again, it is acknowledged that many of the delays and limitations placed on federal coal leasing are not discretionary with the Department because they have been established clearly by the bewildering array of federal legislation which has been passed in the last few years to directly affect federal coal leasing and/or general use of the public lands. Nevertheless, much of the following comments are criticisms of those elements of the preferred alternative discussed in the Statement which would seem to unnecessarily and perhaps unlawfully, minimize the amount of coal available for federal leasing in the first instance while maximizing the delays in issuing any type of federal coal lease and, ultimately, the risk that any such lease will not be issued on terms and conditions which are reasonably acceptable to any operating company. Although the following comments will deal specifically with such criticisms, it is appropriate in these introductory remarks to elaborate briefly on the primary concerns of the amount of land that would be available for leasing and the time schedule for such leasing.

With respect to the amount of federal coal which will ultimately be available under the preferred alternative for the federal coal leasing program, it must be observed with deep regret but not with a great deal of surprise that the Department's present position is apparently that, if all the various government agencies to be directly or indirectly involved in leasing cannot, among themselves, or by virtue of public comment think of any reason for excluding a tract of federal coal land from leasing, the tract in question might possibly then be considered for a lease sale. Some specific parts or characteristics of the preferred alternative which would seem to unnecessarily restrict the amount of federal coal available for leasing are:

1. Designation, by means not fully discussed and probably not quantifiable, of only those reserves of "medium and high potential" as available for leasing;

2. Apparent reliance on existing Known Recoverable Coal Resource Areas (KRCRAs) as defining the areas in which future federal coal leasing will be considered, even though the present KRCRAs include a very small portion of all of the federal lands that are known to contain the coal resources; and

3. Implementation of no less than 24 separate unsuitability criteria for elimination of otherwise qualified federal lands from any future consideration for leasing by what will apparently be a much more uncompromising application of such criteria than is mandated by law and which has been experienced in the past.

The preferred alternative would also seem to take every opportunity to maximize the delay in offering any lease or leases for sale even under the so-called short-term or emergency leasing procedures. Although some public hearings and the preparation of environmental impactment statements are required by law or court decision at various levels in any federal coal leasing program, it should be recognized that only those hearings, impact statements and other procedures which are absolutely required should be followed and that efforts to involve or increase the involvement of any particular interest in a decision-making process should be done only through the required procedures and not by consistently taking the option of requiring another public hearing or another impact statement or supplement or addition to an existing impact statement.

It is encouraging that the Department is thinking in terms of a definite cycle for leasing, whether that be the initial two-year cycle or the more regular four-year cycle but it is very difficult to believe that such a schedule can be maintained unless much more specific and strict time schedules are imposed at every step during the planning and leasing procedures. Probably the most potentially significant delay in full implementation of any federal coal leasing program is the Department's desire to wait for the completion of general land use planning for each western coal region by all appropriate land management agencies as well as the completion of more limited land use planning efforts such as the wilderness reviews presently being conducted by the Forest Service and the Bureau of Land Management. Although such a delay is not clearly described in the Statement, it would seem to be implicit in the various references to the use of the basic land use planning procedures of the appropriate agencies as the foundation for any and all future federal coal leasing. However, there would seem to be no mandate in any law that such a delay be required. There would certainly seem to be ample opportunity for proceeding with some coal leasing in a region or regions or portions thereof, if any serious attempt is going to made to meet the need projected in the Statement for coal from new federal leases by 1985 and 1990. It is difficult, if not impossible, to conceive of a meaningful land use planning effort which could be completed on a region in time to accommodate the two-year or the four-year federal coal leasing cycles.

At least one more general observation needs discussion at this point, particularly since it is not a subject that is directly discussed or referred to in the Statement. In reviewing the Statement as a whole, it would appear that the Department is succumbing to the temptation of using the new federal coal leasing program, in whatever final form it might take, as a tool for general land use planning in the Western United States, perhaps partly out of frustration for not having received any legislation from Congress which would mandate such comprehensive planning even for the exploitation of all minerals in the

public lands. It is sincerely hoped that this perception is inaccurate and a statement flatly to the contrary would be received with great relief in the final impact statement.

Any attempt to use what is really a rather limited land use planning effort related to federal coal leasing to set the framework for the much broader problems which result from rapid growth in sparsely populated areas such as most of the Western United States would be an effort doomed to result not only in failure of the specific planning program used to try to accomplish such larger objectives, but also in the creation of many more problems and the generating of much more controversy than was ever hoped to be solved or avoided by the initial planning program. A federal coal leasing program should not be used to do more than meet the Nation's need for additional federal coal in a manner which is as environmentally acceptable as feasible. Any program so limited to planning for one industry, however influential that industry may be on the future growth of an area, cannot possibly hope, even indirectly, to plan and mitigate adverse impacts from other growth-stimulating industries, such as tourism, without hopelessly stagnating and failing to achieve even the more limited objectives of direct concern to the planning program.

We have enclosed herewith specific comments which address particular sections of the statement.

Very truly yours,

Loren A. Williams

LAW:dh

Enclosure

SPECIFIC COMMENTS
TO THE DRAFT ENVIRONMENTAL
STATEMENT FOR THE FEDERAL
COAL MANAGEMENT PROGRAM

Coastal States Energy Company
February 12, 1979

Chapter 1.

The first paragraph of Section 1.1.2 refers to the solicitation of public comment as occurring not only throughout the evaluation of the draft environmental impact statement over several months, but even after the final statement is issued. The taking of additional comments after the final statement would seem to serve no useful purpose since anyone interested in making comments would have had ample opportunity to do so during the consideration of the draft environmental impact statement.

Section 1.1.2 also describes the various alternatives briefly and reveals vividly in its summation of the preferred alternative that offering tracts for leasing would be the last alternative after all other land use options have been exhausted. It is felt that this was not the intent of either the Congress or the Administration in placing emphasis on rapidly increased development of coal in the Nation which the Statement acknowledges must, to some significant degree, be based on new federal leasing. If it is the opinion of the Department that some legislation demands the assignment of the lowest priority to coal leasing then it would be necessary in explaining the preferred alternative to provide a detailed discussion of that legislation. Furthermore, it would be most enlightening to have a discussion of what, if any, legislative authority there is for putting such uses as the establishment of recreational areas above that of coal leasing.

The description of the preferred alternative in this Section also indicates that regional production targets would be "derived from" the production goals prepared by the Department of Energy. This reference and other references in the Statement suggest that the production goals established by the Department of Energy, in apparent contradiction to the language of the Department of Energy Organization Act, would only be treated as suggestions by the Department of the Interior and could be modified by that Department or completely ignored. The Memorandum of Understanding in Appendix B to the Statement which deals specifically with this subject is not clear on which Department would have the ultimate authority to determine production goals. It is vitally important to industry as well as to impacted communities and local and state government bodies that the authority for setting and maintaining such production goals is clarified.

Section 1.1.4 suggests that, although the Department will complete ongoing regional environmental impact statements, it contemplates the preparation of at least an environmental analysis for each and every coal lease and mining plan which would probably result in the initiation of a full environmental impact statement for most such leases and plans as well as new regional impact statements and revision and updating of the programmatic impact statement. Such a procedure again requires unnecessary delays. As is evident from Figure 1-2,

most of the major areas where coal mining is planned or can be expected to occur in the West are currently covered by a regional environmental impact statement that has either been completed or is in some stage of preparation. Even with significant new leasing in any particular region, much of the information that has already been presented or has been collected for ongoing regional impact statements can be used for any new additional leasing in the area. This information includes general topics such as climatic conditions, reclamation characteristics and certain socio-economic considerations. It is urged that the Department make it clear in the final programmatic statement that wherever possible, such information will be incorporated by reference and that ongoing regional impact statements will be only supplemented or updated where new leasing is provided, in order to minimize delay.

It is acknowledged that there could be instances in which so little coal activity has been reviewed in existing impact statements and so much more activity is proposed in a particular region that an entirely new regional impact statement is necessary. However, experience with already completed regional environmental impact statements indicates that in all probability most new leasing in the regions can be accomplished by update or supplement to the regional environmental impact statement for the area without the delay resulting from the preparation of an entirely new statement. Similarly, the preparation of an environmental analysis should not require the extensive public notice and hearing requirements of a full environmental impact statement. This is particularly true if such analyses are going to be prepared for even the smallest lease or mining plan. The Department should seriously consider establishing guidelines for the accelerated review of leases and mining operations which are small, either in the amount of tonnage to be produced or the amount of acreage to be disturbed. Also, detailed guidelines are needed on just at what stage in the preparation of a regional impact statement additional specific mining projects will not be included in the regional analysis and what effect, if any, that would have on the schedule for permitting such projects which would be subject to site specific analysis or a site specific environmental impact statement in any event.

There would seem to be no apparent reason for preparing an individual site specific analysis for each federal coal lease being offered, since the issuance of the lease itself is not an action which in and of itself results in the disturbance of any surface or any other adverse impact on the environment. Furthermore, preparation of an analysis or impact statement for a lease only results in duplication of effort and more unnecessary delay when the very same impacts have to be analyzed in only slightly more detail when a mining plan for the same lease is analyzed or reviewed in an impact statement soon thereafter. At least the process of reviewing the lease and the mining plan ought to be combined or if an analysis or impact statement is prepared for the lease, it should only be supplemented or updated to include specific or different impacts peculiar to the mining plan proposed which were not adequately reviewed at the time the lease was considered.

The last paragraph of Section 1.2.6 does suggest that the Department will be using much of the information generated by ongoing regional impact statements

for the environmental analysis of any new federal leases to be issued in the same area in the future. If this is indeed the intention of the Department, as recommended in the above comments, then the Department should make this clear and should definitely state that it intends to maximize the reuse of such information so as to minimize delays and duplicate efforts.

Section 1.3 deals with the authority for the federal coal leasing program and the restraints on that leasing in general. In reviewing this Section, one has to be impressed by the incredibly strict controls which have been placed by federal law on all aspects of coal mining and particularly mining on federal coal lands. At the same time, it is rather odd that the Department of the Interior with all the legal authority at its disposal to so control federal coal mining, feels compelled to take the rather timid alternative of restrictive leasing which is not even designed to meet industry or market demand or the Department of Energy production goals. Perhaps, this attitude is the only approach which has any practical chance of avoiding more protracted litigation from environmentalist groups. However, the Department should seriously consider modifying the Statement in its final form to argue that even if it finds it necessary in future years to accelerate production to meet demonstrated need which would more closely approximate industry demand and/or Department of Energy production goals, it is justified in doing so. This will be true because any such coal development will, by law, occur under the most strict conditions requiring that any such leasing be done to give the government the fair market value for the coal, to require absolutely that that coal will be leased to companies which will shortly thereafter be compelled to develop the resource, and to mitigate environmental impacts to the maximum extent feasible. All of these results will occur without reliance on the discretion of the Secretary of the Interior or any lower government officials.

Section 1.3.1.3 described the Surface Mining Control and Reclamation Act of 1977 as an Act which would transfer to the States which properly qualify, the primary responsibility for administration and enforcement of the Act. This is indeed an accurate statement of what was intended in that Act, and certainly what was intended by the Congress as reflected in the appropriate legislative history. However, the currently proposed final regulations issued by the Office of Surface Mining have created a great deal of controversy on many points, including the apparent desire by that Office to maintain as much of its direct authority over coal mining, not only on federal coal lands but on private coal lands despite any assumption by the States of that authority as contemplated by the Act. It is hoped that the final programmatic impact statement makes it clear that any such retention of authority by the Office of Surface Mining is not consistent with SMCRA and must be rejected.

Section 1.3.2.1 describes the joint and separate responsibilities of the Department of Energy and the Department of the Interior as specified in the Department of Energy Organization Act. It is apparent from the brief description given in this Section that many more areas of conflict or potential conflict exist between the two Departments in exercising their relative responsibilities

than just the area of production goal setting which is the subject of the Memorandum of Understanding in Appendix B. Therefore, it is certainly necessary that an effort be made in the final environmental impact statement to delineate as much as possible the relative areas of responsibility and a timetable for how such responsibilities will be exercised so as to not result in any unnecessary delay in the processing of a lease sale. It is realized that the potential conflicts of this nature are not the result of the action or inaction of either Department, but the difficulties inherent in the provisions of the Department of Energy Organization Act. Nevertheless, such potential conflicts have the prospect of creating considerable delays due simply to the problem of trying to determine who in what Department should make what decision and when in the processing of any new federal coal leases for sale.

In the second paragraph of Section 1.3.3.3, reference is made to the fact that SMCRA gives the Office of Surface Mining little discretion in enforcing the provisions of that Act. Such a statement would certainly come as a surprise to the drafters of final regulations for that Office and the critics of those regulations which are being hotly debated at this time. It would seem that the Office of Surface Mining has somehow developed the attitude that the Act gives them a lot more discretion in formulating regulations and implementing the various provisions of the Act than the drafters of this Statement and other agencies of the Department of the Interior recognize. It might very well avoid a lot of extensive litigation if the Department would, from the higher levels of the Department, work directly with the Office of Surface Mining to assure that the regulations which it develops are indeed within the tight authorization granted to the Office by SMCRA.

Section 1.3.2.4 refers to the authority of the Forest Service to add terms and conditions to coal leases on lands to protect resource and environmental values. The Forest Service should be given the opportunity in the preparation of the final impact statement to suggest what, if any, additional terms and conditions it might consider standard stipulations and the authority for the addition of those stipulations. It would appear that the draft Statement has covered virtually every legal authority which would apply to unsuitability of lands for mining and the imposition of required environmental protection terms in all federal coal leases. Therefore, it would be interesting to see what additional authority the Forest Service has and how it might propose exercising that authority to further restrict or add to the cost of mining in national forests. Also, it is not clear from the text of this Section whether the Department of Energy is considered to still have its veto authority over terms and conditions suggested by the Forest Service under the general authority of that Department to veto federal lease terms pursuant to the Department of Energy Organization Act.

Chapter 2.

Section 2.2 (page 2-3) makes reference to the fact that although the vast majority of low-sulfur coal reserves are in the western coal states, there are substantial low-sulfur reserves of coal in the East. This fact has been misconstrued by many critics of renewed federal coal leasing to indicate that such low-sulfur coal in the East is a readily available and viable alternative to expanded federal coal leasing. As is stated in the same Section 2.2, such low-sulfur eastern coal is by and large of metallurgical quality and it should be pointed out in the final environmental impact statement that most of these metallurgical reserves are owned by steel corporations and produced through "captive" mines only for the steel mills of the parent corporation. Under such circumstances, it is obvious that these low-sulfur Eastern metallurgical coal reserves are not available as a viable alternative to increased leasing of low-sulfur steam coal reserves in the West. Furthermore, the metallurgical coal reserves which are not owned by steel corporations in the East are either committed to long term contracts to steel corporations or would not be economically mineable as steam coal. In any event, it would be folly to rely on this reserve of low-sulfur coal to fuel power plants and industrial boilers, thus depriving the nation's steel industry of one of its basic raw materials. Metallurgical coal can be used to generate electricity, but steam coal cannot substitute for metallurgical coal in steel making.

On the same page of Section 2.2, it is stated that the mining of federal coal will be concentrated in existing KRCRAs. Yet these Areas presently include only 17.1 million acres and cannot be expected to include more than 25 million acres when all mapping is completed at a date which is apparently indefinite at the present time. As already mentioned above, it would appear that the Department has decided not to significantly expand these areas and to restrict new coal leasing to those areas. This would seem logical until it is realized that the acreage covered by the various Areas is only a very small part of the approximately 100 million acres of coal lands owned by the United States in the West. A comparison of Figures 1-1 and 2-1, showing the general coal fields of the Western United States and the KRCRAs in the same region, respectively, clearly display the enormous and unjustified disparity between the present size of these Areas and the actual areas known or reasonably inferred to contain coal resources. By starting with the KRCRAs as the areas in which coal leasing must occur, the Department has already and without any detailed industry input, excluded at least three-quarters of federal coal lands from leasing. This situation must be rectified in the final impact statement with appropriate recognition of the fact that new and expanded KRCRAs can and will be developed to include any federal coal lands otherwise suitable and available for leasing.

Section 2.4 (page 2-10) discussed the effect of recent changes in federal air pollution standards for coal-fired power plants with the incredulous conclusion that: "(O)verall demands for western coal will not be greatly affected by the new air quality standards, because most new demand for western coal will be from power plants and industries in the West." Although most demand for western

coal will apparently come from coal-burning facilities in the West, it is indicated in Section 2.6.2 (page 2-25) and in the accompanying Table 2-18, that the Department of Energy has projected "substantial amounts" of western coal to be shipped to the East by 1985 and in even larger amounts (as much as 299 million tons) by 1990, with such amounts representing a significant portion (as much as 30%) of total western coal production, by 1990. Therefore, the deliberate attempt in the recent Clean Air Act Amendments to artificially increase the price of western coal by the imposition of stricter sulfur emission regulations with no pretense of benefiting the public health and welfare is and will remain a significant adverse factor in the expansion of western coal development in general. The sentence before the sentence quoted above from Section 2.4 attempts to mitigate such harsh effects by stating that the new air standards would not apply to power plants coming on line until after 1983. Such an observation offers little to change the conclusion as to the severity of the effect of new clean air emission requirements on western coal production since many of the plants which are scheduled to come on line after 1983 are already well into the planning stage, including considerations as to contracting for adequate supplies of coal.

Section 2.5.5.1 (page 2-23) concludes with a sentence to the effect that uncertainty about legal ownership of coal seam methane gas and production rights for that gas are inhibiting its production. This is indeed the case in the East, especially, but it also points out an opportunity for the Department to determine within its existing authority whether newly issued federal coal leases or readjusted federal coal leases will include such gas and the right to produce it, thus mitigating if not eliminating future problems in producing such a valuable fuel from federal coal lands.

Section 2.7.1.3 makes reference to the fact that some Preference Right Lease Application holders will never be issued a lease because they have failed to meet all the legal requirements of such applications by filing them on land containing mining claims. This statement is apparently based on a recent Solicitor's Opinion which strains to construe language in the relevant statutes concerning such applications on "unclaimed" land as requiring that that land was not subject to mining claims at the time of application. Aside from the fact that this Opinion is based on such questionable legal authority and will almost certainly be challenged repeatedly by holders of applications rejected on this ground, it is only fair that the Department should provide in the final impact statement, either by regulation or as part of the final judgment in NRDC v. Hughes, that such holders of applications on areas with prior mining claims will be given an opportunity to either show the invalidity or subsequent abandonment of such mining claims. The rejecting of applications on this ground is particularly difficult to support since past practices of the Department consistent with the Multiple Mineral Development Act have clearly recognized that it was the intent of Congress to accommodate and not to restrict the development of locatable minerals (i.e., acquired by mining claims) and leasable minerals on the same tract of public mineral land.

Section 2.8.1 speaks in general terms of the anticipated time schedule from the issuance of a new lease to actual production under the new leasing program. It

is sincerely hoped that the time schedules for the approval of the mining plan as well as the initial completion of land use and environmental planning are accurate. However, it must be observed that if they are to be, there must be a major streamlining of the present maze of "red tape" which has resulted in the processing of most mining plans and environmental analyses taking considerably longer than the schedules mentioned in this Section. It would be most comforting to prospective applicants for new federal coal leases if the Department would endeavor in the final impact statement to impose some type of strict schedule coordinating all the various public hearings, comment periods and inter-agency reviews and planning that must occur before a lease is issued and afterwards before all of the federal authorizations are obtained to commence mining.

On page 2-44, the observation is made that since western mining is expected to be almost entirely surface mining, except in the Uinta-Southwestern Utah Coal Region, the production from the underground FRLAs which can be processed under the NRDC v. Hughes settlement agreement will not contribute significantly to total production. This admission would seem to graphically point out the need for renegotiating the settlement agreement in NRDC v. Hughes, to the extent that it restricts not only surface mining from FRLAs but surface mining from emergency and by-pass leases, either directly or implicitly. Again with the myriad of laws protecting the environment, especially from the adverse effects of surface mining, there can no longer be any excuse for refraining from developing coal by whatever methods best suit the extraction of the particular reserves in question.

In general, Section 2.8.1 does a good job of supporting the need for additional federal coal leasing to the extent that such need is quantifiable. This support should be more than enough to satisfy the objections raised by the Court in NRDC v. Hughes. It is particularly comforting that the Department has made it clear that its projections are just that, and that the program will remain flexible enough to not only reduce the amount of coal leases to be offered under the new program, if such reduction is necessary, but also to be equally adaptable to increasing the number of leases if the need should prove greater than the projections relied upon for the preferred alternative for the new program.

Unfortunately, however, Section 2.8.1 concludes with four paragraphs seeking essentially to summarize the balance between the problems created by leasing too much federal coal or leasing too little federal coal to meet actual future demands. It is concluded that when in doubt, the federal government would be better off leasing less federal coal relative to demand than more. This conclusion fails to appreciate the numerous and serious consequences of leasing less coal than can meet actual future demand in terms of the increased price of electricity and virtually all consumer goods which would contribute significantly to inflation not only in the regions most directly affected, but throughout the country.

On the other hand, the disadvantages of leasing more coal than what is needed to meet actual future demand are exaggerated in this portion of Section 2.8.1.

The first such disadvantage is stated as a depression of the bonus bids offered for such coal leases so that the government fails to realize the fair market value for its coal. It should be noted that the amount of money that the government has and can reasonably expect to obtain from any one lease as a bonus bid is only a very small fraction of the total value received by the government by issuing that lease in terms of production royalties and taxes collected. Furthermore, such bonus bids will continue to be regulated in the new program so that no bid would be accepted and, therefore, no lease issued, unless the bid satisfied a minimum amount which was predetermined as reflecting the fair market value of the lease. Furthermore, elsewhere in the Statement the Department spends a great deal of time discussing alternate competitive bidding systems which would to some extent remove or further diminish reliance on the lease bonus as even partially achieving the fair market value of the lease. Consequently, it is difficult to support the conclusion that an excess of leases offered would result in so much less compensation being paid to the government in lower bonus bids that the resulting loss would not be more than offset by the total gain realized when even a few such leases are developed.

Another reason given for diligently avoiding leasing more than what is necessary to meet the actual demand is that such a procedure would give the federal government less control over where the coal is developed. This statement ignores the myriad of laws which give the government authority after a lease is issued to still determine the how, when and where of coal production from the various leases. Certainly, any less direct control over where mining takes place would be more than compensated for by the existing authority under these laws to regulate such mining through mining plan approval and indirectly through approval of, for example, rights of way in the construction of major transportation and power line facilities. Finally, it is argued that the strict enforcement of diligent development and continuous operation criteria in a situation where an excess number of leases were issued might force coal companies to rush leases into production prematurely. Again, the ability to approve, delay the approval of, or reject mining plans where such a "mad rush" threatens, would certainly provide the government with enough authority to prevent any such adverse effects.

It should also be noted that opting to err on the side of leasing insufficient coal would be much more likely to result in a rush to develop existing federal coal leases and nonfederal coal which, as recognized in Section 2.8.2, would carry a host of potential adverse effects and would greatly increase speculation and the probability of inefficient operations on these other reserves. Sections 2.8.2, 2.8.3 and 2.8.4 provide additional arguments and support of the basic conclusion that it really is more advantageous to lease more reserves than might actually be needed in the future rather than leasing in a manner which would not meet that need. It is hoped that the Department in the final impact statement will give serious consideration to making clear a preference for leasing more rather than leasing less, although it is recognized that keeping the Statement for these sections in its present form would probably make it less susceptible to challenge by critical environmental groups.

Section 2.9 begins with a statement to the effect that it was the intent of Congress in the Federal Coal Leasing Amendments Act of 1976 that the new federal leasing be done "at a rate meeting market needs for new supplies." Again, this would tend to negate the Department's apparent position that it is better to lease less than what is necessary to meet those needs rather than to lease more. That Act certainly is more reasonably read as an expression by Congress that, considering the extensive laws and regulations which will mitigate the impacts of coal mining on any leases and the diligent development and continuous operation requirements which will compel the production from or termination of leases, the risks involved in leasing more than what may be actually necessary are more imaginary than real.

The third paragraph in Section 2.9 indicates that the Department's preferred alternative production goals are as low as they are primarily due to the Department's reliance on the EMARS-inspired production goals announced by existing and would-be operators on federal lands. This is indeed a curious justification for lowering production goals particularly since earlier in the Statement with the initial discussion of such production goals it was indicated that the Department had, not without some justification, discounted the same industry production estimates as in some cases nothing more than wishful thinking. The Department should reassess the lowering of production goals from new federal leasing in reliance on the admittedly inflated production goals from some existing federal leases or Preference Right Lease Application areas.

On page 2-51, comments are made concerning the coordination of the federal coal leasing program with existing public land use planning processes indicating that the federal coal leasing program would have to wait for the completion of these planning processes. As referred to above in the general comments, this decision could result in paralyzing delay for the new federal coal leasing program particularly if long range studies such as the Bureau of Land Management wilderness review and the similar review being conducted by the Forest Service for the second time must be completed before the government would feel comfortable in proceeding further with federal coal leasing in the areas under study or in adjacent areas. Such general statements undermine the confidence of the industry in the Department's numerous promises in the Statement as to the time schedules anticipated for federal coal leasing in general and, in particular, the schedule for the completion of planning which is preliminary to any new coal lease sales.

Also, this part of Section 2.9 assures the reader that the numerous unsuitability criteria based on the preservation of recreation areas, wildlife habitat, agricultural resources, etc., will be administered in a way to flexibly accommodate federal coal leasing. However, published reports (discussed in Section 5.4.8, p. 5-141) have indicated that the application of a somewhat stricter set of unsuitability criteria to lands in Montana and Wyoming resulted in the exclusion of approximately one-third to one-half of all federal coal lands otherwise available for leasing. It would appear from this result that there is little if any real flexibility in the application of such criteria to the extent

that it would seriously seek to balance new federal coal leasing with other land uses. It is hoped that in applying such criteria that the government will keep in mind that federal coal lands, however defined, occupy a very small portion of all public lands available for multiple use in the West and that within those federal coal lands, only a small portion will be offered for lease as needed to maintain any projected production goals. Therefore, the overall effect on, for example, wildlife habitat, of the issuance of a particular lease or a few leases in a region should not be viewed as relative to the remaining federal coal land available for leasing but should be viewed in terms of all federal lands in the region available for wildlife habitat preservation.

Chapter 3.

Section 3.1.1 describes the general characteristics of the preferred alternative for the proposed federal coal leasing program. In general, this discussion should satisfy the requirements resulting from the decision in NRDC v. Hughes that any proposed federal coal leasing program be described in sufficient detail.

There are, however, several points concerning this program which are disturbing to industry. First is the apparently inflexible requirement that all necessary land use planning involving the identification of coal lands, the application of the numerous unsuitability criteria and the nebulous resource trade-offs be completed before the activity planning state can proceed which involves regional production targets, preliminary tract identification and ranking and the preparation of regional environmental impact statements. Considering the tens of millions of acres of land involved even if new coal leasing is restricted to existing KRCRAS, it is difficult to believe that the Department can maintain the schedule for resuming actual lease sales within eighteen months after the adoption of a coal leasing program. In fact, related land use planning efforts by the primary public land administrative agencies, the Bureau of Land Management and the Forest Service, concerning wilderness designation would seem to make it absolutely impossible to keep such a schedule. It is imperative in the final impact statement that such doubts be addressed and that the details of the preferred alternative be expanded to include specific assurances, with supporting illustrations, that such a schedule can be accommodated.

Section 3.1.1.1 deals in detail with the various planning systems of the preferred alternative. Under the Land Use Planning portion of this Section the first criteria for screening out areas unacceptable for new federal coal leasing would be areas that do not contain coal reserves of high to moderate development potential. It is not clear what authority or justification the Department is relying on in applying this criteria which is presented as distinct from the general unsuitability criteria and every other factor suggested by law or regulation which should affect the potential development of coal reserves. Apparently, the Department is attempting to substitute its engineering and marketing judgement for that of the industry and this is not warranted. The economic potential for the development of reserves aside from clear legal restrictions, is constantly changing and the federal government cannot hope to have as much information concerning current market conditions or have sufficient expertise to predict future market trends as will potential lease bidders throughout the industry. Since this screening criteria is so nebulous, it would be appropriate to include in the final impact statement, at the very least, some detailed justification for this screening criteria along with an example of how the criteria might be applied over and above all other restrictions and limitations on new federal coal leases to exclude property which would otherwise qualify for a lease sale.

In the same section on Land Use Planning, a very disturbing implication is left that the Department will indirectly engage in population control, presumably only at the instance of a state government request, by deliberately limiting

coal production from a region regardless of other factors and of the market demand in order to accomplish an artificial maximum limit on population in that area. It is unknown what, if any, authority the Department could claim for such action but it would certainly be necessary for the Department to elaborate on this suggestion in the final impact statement and particularly to discuss what, if any, public input would influence a decision to so control a region's population even without the request of any state government.

The next portion of Section 3.1.1.1 discusses the Activity Planning stage of the proposed preferred alternative. Although public participation throughout the process is necessary and the objective of giving ample opportunity for that participation in the Statement is commendable, it is felt that the same desired result could be obtained without a proliferation of public hearings. Such public hearings are usually events in which little opportunity is given for reasoned, in depth analysis of the problems to be discussed simply because of time constraints on each speaker. Furthermore, any of the speakers that are really serious in commenting or influencing a government decision on the subject of the hearing invariably submit written comments in which everything that was said at the public hearing is repeated plus, usually, the much more valuable detailed information and opinions relevant to the federal actions being considered. Therefore, it is suggested that, unless absolutely required by law, the Department refrain from holding hearings throughout the coal regions at each and every opportunity. Instead written comments only should be solicited within reasonably short time periods before the proposed decision or decisions are to be made.

The Activity Planning discussion also refers to the preparation of regional environmental impact statements in which tract delineation, ranking and selection would be discussed. It is felt that it is equally important to involve public comment, and especially industry participation, either by means of the same regional EIS or by means of preliminary written public comment on selection of coal lands, application of unsuitability criteria and resource trade-offs. However, it is not suggested that these additional decisions would require any additional comment or other delay but could be integrated with the consideration of the other elements of Activity Planning which will also be the subject of regional environmental impact statements.

Section 3.1.1.6 describes briefly the policy preferred for processing of Preference Right Lease Applications. The central variation of this process from past procedures would be that these applications would be required to make a showing of commercial quantities twice: once, before any lease stipulations are suggested and presumably in the traditional manner of determining commercial quantities and a second time, after the economic effects of the environmental stipulations are attached. It is indicated that these environmental stipulations would not necessarily be those which are required by law but could be specific stipulations tailored to the particular application. This seems to suggest that the Department by strenuous special stipulations could preclude any determination of commercial quantities in the second showing. Furthermore, the very basis for requiring a second showing of commercial quantities is not explained in the Statement and there appears to be no legal justification for it.

Another feature of this process is the preparation of environmental impact statements on the issuance of the leases themselves. If the applicant satisfies the double test for showing commercial quantities, it would appear to be beyond the Department's legal authority to consider in an environmental impact statement the standard no-action alternative as well as other alternatives to the issuance of that lease since the Department would then be compelled to issue a lease and would have discretion only as to the lease stipulations. If the Department is referring to an environmental impact statement on a choice of alternatives between these stipulations and not on a choice of alternatives whether to then issue the lease or not, such a distinction ought to be made clear in the final impact statement.

Section 3.1.1.8 describes how an emergency leasing system to maintain existing mines or to permit the mining of otherwise by-passed federal coal would be coordinated with the broader federal coal leasing program proposed. The purpose of this emergency leasing program is to respond quickly enough to situations in which a broader long range leasing program would result in the loss of coal or employment unfairly. However, it is apparent from reading this section that since the emergency program could not proceed until the complete land use planning stage is finished that such "emergency" leasing would, for at least the next few years, offer no relief to coal operators who would otherwise be in a position to benefit, and to benefit the government, by mining coal that might otherwise be lost. The need for such comprehensive land use planning before such emergency leasing, which is certainly going to be on a very limited basis either in terms of the acreage in any particular lease or the cumulative effect in any region, would seem to be unjustified. It should be enough that if the emergency lease is not clearly in conflict with the likely land use scheme for the area that the lease could proceed without such crippling delay

The insistence that an environmental assessment be made for each such emergency lease, presumably with a public hearing requirement and resulting delays, is likewise unjustified. It would seem from the discussion of emergency leasing under the preferred alternative that such a system would completely replace any emergency leasing which is not now permitted under the settlement agreement in NRDC v. Hughes. Serious consideration ought to be given to preserving that portion of the settlement agreement which now permits such emergency leasing rather than redoing essentially the same program in the form of a component of the long-term coal leasing program.

Table 3-1 describes in general terms the twenty-four separate unsuitability criteria all of which would be applied to each and every tract of federal coal lands considered for new leasing under the proposed program. In reviewing this criteria it must be again stated that is would appear that the Department's new coal policy is that: "When in the slightest doubt, don't lease." That is, if the collective imaginations of all the government officials and public interest groups which will be influencing the application of this unsuitability criteria cannot exclude coal leasing on the basis of using the land for anything else then that land will have an opportunity to be further considered for possible eventual leasing. It would seem that assigning what amounts to the lowest possible priority to federal coal leasing on any tract of unleased federal coal lands is completely contrary to numerous expressions of Congressional and Administration intent to greatly increase coal production for federal lands.

Certain of the more potentially significant unsuitability criteria deserve specific attention because in some respects all or almost all of them are felt to be overly broad or poorly conceived. The first criterion deals with Federal Land Systems and indicates that all federal lands which are recommended for inclusion in preservation systems such as the Wilderness Preservation System would be automatically excluded from further consideration as unsuitable for coal mining. Taken literally, this would mean that all lands in National Forests presently under review in RARE II process would automatically be given no consideration for coal leasing as well as all lands under the administration of the Bureau of Land Management which are presently being inventoried for review as potential wilderness areas. The Bureau of Land Management review will not necessarily be concluded until the year 1990. Clearly, such an automatic exclusion without opportunity for appraisal by individual land unit or particular lease tract to determine if indeed there is any potential for further review and designation is unwarranted and could eliminate vast tracts of federal coal lands unjustifiably.

The criterion concerning Rights-of-Way and Easements would, with certain exceptions, exclude portions of "federal lands" as unsuitable for coal mining which are within any rights-of-way and easements or within surface leases for just about any use. Since the term "federal lands" is used in the text to describe lands in which the United States owns the coal but private interests own the surface, the application of this criteria would require initially the horrendous task of reviewing title to all private surface over federal coal to identify such rights-of-way, easements and leases. Apparently, the existence of a surface agricultural lease even by one who would not otherwise be granted surface owner protection would be enough to completely exclude an area from future coal mining and particularly from strip mining. There is no legal justification for this situation and this criterion must be strictly limited to landowners otherwise protected by SMCRA so that it is not readily abused by groups which could obtain such rights-of-way or easements for nominal prices in the hopes of delaying or completely blocking federal coal production from the land in question.

The criterion related to Wilderness Study Areas has the same problems as those discussed for the criterion related to Federal Land Systems above.

The dual criterion related to State Lands Unsuitable for mining and State Proposed Criteria would seem to have the potential effect of requiring the Secretary of the Interior to abdicate his authority and discretion in the leasing of federal coal lands to the State in which the federal coal lands are located. Again, there appears to be no legal justification for this extreme result and it is contrary to the clear intention of Congress that the Secretary retain primary authority and discretion for leasing such lands with considerable state participation but not control.

The criteria concerning both federal and state designated endangered species would not seem to allow for the flexibility which has characterized the resolution of problems related to most applications of the Endangered Species Act since its enactment. Environmental groups and the Administration fought the amendment of the Endangered Species Act in the last Congress on the basis of statistics which indicated that of the thousands of instances in which the Act created a

conflict with development of any kind, including numerous coal mining operations, the government, public interest groups and the private companies involved were able to work out compromises which did not result in the serious modification or prohibition of the development. However, when one considers that the application of criteria only somewhat more strict than the criteria presented in the Statement resulted in the exclusion of one-third to one-half of coal lands in sections of Montana and Wyoming as unsuitable for coal mining based largely on identification of endangered species and critical wildlife habitat, it would appear that these two criteria are going to be applied in the proposed alternative for the long range federal coal leasing program with an inflexibility that would not permit similar compromises but would completely prevent the development of coal operations on the lands in question. If these implications are indeed an accurate reflection of what the Department is proposing in this Statement, then that should be made clear and a justification should be presented in detail for departing from what has been a rather successful and reasonable past practice.

The last criterion which deserves particular mention is the one related to reclaimability. In the text the discussion of reclamation assumes unusually long time periods (ten to fifteen years) for reclaiming to legally required conditions. Apparently this time period really assumes that the initial vegetation will not be completely compatible with surrounding vegetation in undisturbed lands and that reclaimability means the slow natural progression of grasses from neighboring undisturbed lands to establish dominance over and eliminate other native grasses which are required by law to be planted in the disturbed areas. Obviously, putting the burden, as it is apparently is placed, on the operator or potential lease bidder to prove such reclaimability would require long term tests that could greatly frustrate any renewed federal coal leasing in the next decade. Certainly, the Department could not have intended such a result. It is hoped in the final impact statement that this area of concern will be clarified by making it definite that compliance with existing federal reclamation requirements will be all that is necessary to prove reclaimability and that the land will not be completely withheld but that flexibility will be applied to conduct test mining operations to give a potential operator or bidder ample opportunity to prove reclaimability of the tract involved when such proof is necessary.

Section 3.2.3 briefly discusses the use of coal production targets. Although the Department professes to place great reliance on industry participation in the entire coal leasing program, this discussion indicates that the Department will not even seek expressions of industry interest in particular tracts for leasing purposes until after all of the various criteria have been applied for detesmining which lands in a region are acceptable for consideration for leasing. That is, industry would not really be able to effectively participate or would not be listened to until after the most important and far reaching decisions concerning the availability of coal lands to the industry had already been made. There is absolutely no justification for this procedure. Such a situation would give non-industry groups, many of which are and will remain adamantly opposed to any significant new leasing, an opportunity to unfairly influence the thinking of government decision makers at the most critical initial stages of planning.

Also, there seems to be no reason why the use of production targets, which should already be known to the government officials conducting the land use planning, can not be considered in the general land use planning process. If the Department is serious in treating coal leasing equally with other land uses then the justification for permitting the consideration of production goals throughout the land use planning process would seem to be apparent. Also, it must be noted that several of the unsuitability criteria contain exceptions which apparently rely on the method of mining that would be used and/or on proof that the mining would not adversely affect the environment in certain ways or would not adversely affect other property interests. It is difficult to understand how the land use process is going to proceed to determine fairly what land is acceptable for mining by applying this criteria without significant industry input. There would be no indication from industry what if any interest there is in conducting particular types of mining on tracts. The exclusion of such tracts might depend on the type of mining as well as the degree to which potentially adverse environmental affects can be mitigated through industry suggestions for relocation of roads and other facilities. These facilities may be otherwise erroneously assumed by the planners to be locatable only on certain lands with unacceptable impacts on the environment.

Section 3.2.1 (p.3-18) makes reference to guidelines of the Federal Land Policy and Management Act which include the giving of priority to designation and protection of areas of critical environmental concern. Such areas have been highly favored recently by some of the environmentalist groups as representing a compromise between industry and environmentalists in the battle over designation of lands for wilderness preservation. It is of course uncertain at this time how much land otherwise available for new federal coal leasing would be segregated as a result of the designation as areas of critical environmental concern. However, it is initially puzzling that this type of land use designation is not specifically listed or discussed in any of the unsuitability criteria. Hopefully, this can be construed to confirm that areas of critical environmental concern will be treated as wilderness areas are in the Statement, namely, as areas which automatically prohibit new federal coal leasing. There is nothing in FLPMA which would suggest that such areas should be treated like wilderness areas. It would be very helpful if the Department made clear in the final impact statement that areas of critical environmental concern will not be automatically excluded from consideration for new federal coal leasing.

Also on Page 3-18 the land use planning process for excluding lands as unacceptable for consideration for coal leasing is again described but this time it is stated that land would not be excluded in favor of another use unless that other use was clearly superior to new federal coal leasing. This statement is easily lost among the many statements which would indicate to the contrary that new federal coal leasing has been given a very low, if not the lowest, priority among all other land uses. The final environmental impact statement should correct this confusion by consistently stating that federal coal leasing will not be eliminated as a possible land use in favor of any other land use unless that alternate use is clearly superior to coal leasing.

At the end of Page 3-18 the final paragraph refers to the fact that the land use plans would be updated only every five to seven years. This would appear

to be inconsistent with the long term four-year cycle of new coal leasing. Presumably each new lease sale would require at least a review and possible update or supplement to the land use plans to reflect changed conditions particularly as regards criteria which previously applied to exclude lands from mining.

Section 3.2.1.1 describes the unsuitability criteria. In the third paragraph of that Section a statement is made to the effect that Section 522 (a) (3) of SMCRA lists certain specific criteria for determining lands unsuitable for coal mining including those lands considered renewable resource lands which are described in the Statement as including "aquifers". This would suggest that, since most coal seams near the surface in the West are acknowledged in another part of the Statement to be aquifers that these seams would automatically be excluded. A more careful reading of this section of SMCRA indicates that aquifers would be excluded only if the operations would result in a "substantial loss or reduction of long-range productivity of water supply...."

Section 3.2.1.4 concerns the concept of threshold development levels. It is certainly hoped that such threshold development levels are not going to be considered fixed for all time if once made. Rather, it should be made clear that with changing population patterns which may not be controllable through coal leasing, such threshold levels may have already been exceeded with no harm to whatever environmental condition is to be protected. Therefore, the level of leasing can be increased on the basis of this new evidence. Also, in situations where, for example, critical wildlife habitat is destroyed by other activity, such as timbering or accidentally by forest fires, it is hoped that the land use plan will promptly be revised to remove the threshold that otherwise constrained additional coal leasing.

Section 3.2.3 discusses setting of regional production targets and refers to the fact that the preferred alternative would use the near and mid-term national production targets already set or to be set by the Department of Energy. This sounds as though the alternative considered in this Statement to lease to meet the Department of Energy goals will be a part of the preferred alternative even though statements are repeatedly made that the Department does not prefer such a system at this time.

Section 3.2.4.4 lists several alternatives being considered for sale and bidding procedures for new federal leases. The sliding scale royalty bidding would increase the percentage royalty with the value of the coal. With coal prices expected to continue to rise, this method would probably insure that marginal deposits or small areas of logical mining units would be increasingly by-passed by companies. The profit sharing method would probably be the worst of all worlds for both the government and the operators since the government would effectively have nationalized the portion of the coal mining industry engaged in mining new federal leases requiring an horrendous new bureaucracy.

The fixed rental method would probably not reflect a return of fair market value to the government over the long term period.

Section 3.2.5.2 summarizes the general public participation in the proposed program. Again, it must be emphasized that submission of written comments are

much more effective than public hearings and do not waste as much time.

Section 3.2.7 describes the emergency leasing system. The primary objection to this system is that there is hardly time to respond to true emergencies or by-pass situations. Although some time-consuming planning is eliminated, the sale of an emergency lease would apparently take years or almost as long as a typical long-term new federal coal lease.

Section 3.3 discusses various issues and alternatives to decisions tentatively made in the preferred alternative for the coal leasing program. Much of the material discussed here has already been commented upon in earlier sections. However, some of the particular options considered here deserve further attention.

Section 3.3.3 indicates that existing leases and preference right lease applications will be the subject of environmental stipulations which are clearly stated as expected to result in the exclusion of part, or perhaps even all, of the leases for mining. Apparently, the Department would resort to condemnation by regulation if an exchange or outright condemnation would prove too expensive or time-consuming. This would appear to be the Department's policy as the answer to its continued inability to obtain all the authority it would like for exchanges and condemnations from Congress despite repeated efforts. The Department should discuss in the final impact statement what, if any, compensation would be paid to preference right lease applicants or an existing lessee for such condemnation by regulation. The Department is reminded that although government bodies have had increased authority in recent years to regulate private property it is still a fundamental principle that regulation which becomes an outright prohibition of any use of property amounts to a condemnation requiring payment of just compensation.

Section 3.3.4 suggests that in dealing with split-estate leasing the Secretary would attempt to regulate the amount of compensation paid for surface owner consent through some vague notion of fair market value while publicizing all consents. If such publication would include the details of the compensation to be paid to the surface owner, the Secretary may find it indeed difficult to restrain any rapidly spiraling compensation to surface owners. All of the surface owners who had not yet given a consent but who would be willing to do so, would ask for at least the compensation which was paid to the highest paid surface owner whose consent was already published. Such high compensation may be totally out of line with any realistic notion of fair market value or the rest of the marketplace simply because the landowner in question had an unusually high bargaining power relative to the particular operating company.

Section 3.3.6 discusses maximum economic recovery and notes that the Secretary considered five definitions of this term. These five definitions should be spelled out and explained with their relative advantages and disadvantages. Table 3-3 (Page 3-32) discusses only three alternatives, including the preferred option of requiring maximum economic recovery of all coal seams which are collectively profitable. Before industry can react properly to the selection of this definition, it would be helpful to take a typical property in the West whether leased or unleased and describe how this definition would be applied. It is

feared that the Department will require the mining of thin seams relatively close to large seams which would greatly increase the production of waste rock, minimize efficiency (particularly of underground mining) and perhaps create unsafe conditions both inside the mine and for the surface disturbed directly or indirectly by the more extensive mining. In effect, the Department is seeking to substitute its engineering knowledge, which is relatively limited, for that of industry which has for decades functioned well to recover as much coal as could safely and efficiently be extracted. It should not be the function of any government agency in this time of spiraling inflation to encourage inefficient resource extraction of any mineral on the excuse that to do so is necessary ro recover as much of the mineral as possible under general conservation principles.

Of all the disturbing provisions in the Statement, Section 3.3.7 clearly has the potential for the most damage to maintaining a competitive and efficient coal industry for this Nation capable of responding to the energy needs of the public at large. Here, again, is an excellent example of the Department attempting to use a coal leasing program to accomplish a lot more than simply leasing federal coal in a manner to meet increased needs while doing so in an environmentally acceptable manner. These relatively limited objectives are the only objectives for which the Department has any authority to pursue in this Statement. It clearly does not and should not have any authority to determine the end use of the coal to be produced. The market place has functioned remarkably well in determining such use. When the government interferes by price controls or end-use controls, such as in the natural gas industry, the results are inevitably much worse than the problems sought to be solved. It is hoped that the Department will reflect upon the past misallocation and wasteful use of much of the natural gas consumed in this country which was for decades encouraged by the federal government and realize that such end-use controls are perhaps the most improvident and irresponsible of all considerations studies in the formulation of a federal coal leasing program.

Section 3.3.9 concerns the relative detail of stipulations for environmental protection which would be attached to a particular lease prior to sale and then to any mining plan submitted upon lands covered by that lease. The only comment on this procedure is that it would be a great disservice to the objectives of the coal leasing program if the stipulations attached to the mining plan were significantly different or more restrictive than those attached to the lease. A bidder for the lease has, in all fairness, a right to know that the mining plan stipulations will not be so different from the lease stipulations or from typical mining plan stipulations that a significant quantity of the coal he had expected to mine is rendered unmineable.

In Section 3.4 there is a brief discussion of numerous on-going studies which are described as clarifying procedural details and which will apparently not be the subject of any further impact statements. Although the Department is not encouraged to increase the number of impact statements for any reason, it is felt that these studies are so important to industry and other public interests

that failure to at least provide an adequate public comment period for them could seriously jeopardize the legal defensibility of the entire federal coal leasing program as well as result in an inequitable situation in which parties most knowledgeable in the areas specifically being studied would not be given the proper opportunity to influence the decisions of the Department.

Chapter 4.

Chapter 4 deals with a region-by-region description of the general environment in each coal region of the nation. Since our attention is primarily with the Uinta-Southwestern Utah Coal Region, we will concentrate our comments on the section of Chapter 4 related to that region only.

It should initially be observed, however, that as regards the unsuitability criterion of reclaimability, several comments are made for the separate regions which indicate that enough knowledge has already been generated to prove that such reclaimability is usually not a serious problem. See, for example, the comment in the third full paragraph on page 4-30 to the effect that none of the regions are particularly fragile and that with proper soil and vegetative management all can be reclaimed to a near original state following mining. Presumably, the Department will not lose sight of this admitted fact in requiring proof of reclaimability in any region.

Near the end of Section 4.9.1 on page 4-38, the discussion is directed to the reclaimability of lands in general and particularly in the Uinta-Southwestern Utah Coal Region. In stating that the reseeding process may take several years during the drought cycle, the Department is apparently making the unrealistic assumption that mines cannot be expected to have a water supply available for irrigation during the reseeding process. On the contrary, a coal mine simply cannot function without an adequate water supply for many purposes including hydromulching and other reclamation processes.

The second paragraph on page 4-38 refers to the deterioration of some watersheds in this region as a result of overgrazing by domestic livestock and big game animals. Presumably, therefore, the Department will not be so sensitive to relatively small scattered impacts on wildlife habitat as a result of the predominantly underground coal mining which is expected to occur in the Uinta-Southwestern Utah Region. Furthermore, it is hoped that this paragraph does not suggest that coal mining companies will have to bear significantly higher reclamation costs in order to compensate for such overgrazing, much of which occurred not only with the consent but the encouragement of federal land use agencies over the past several decades.

CHAPTER 5.

Section 5.1.2. discusses the assumptions made by the Department for analyzing future regional impact of the proposed federal coal leasing program.

One of these assumptions expects that the production goals established by the Department of Energy will be met. However, in several instances early in the Statement the Department of the Interior indicated that it would not expect to meet these goals by its preferred alternative. Therefore, it would appear that the assumptions determining the environmental impact of the coal leasing program are deliberately based upon the "worst case" situation. Although typical of environmental analyses, such a situation is not at all appropriate here since the Department has made it clear that the worst case is not preferred and that the preferred alternative will probably be selected with rather insignificant changes if any program is initiated by the Secretary.

Another one of these assumptions is that no significant delays will be experienced by operating companies in obtaining any and all of the myriad authorizations from federal, state and local agencies. The industry would like nothing more than to be able to believe this, but based upon past experience and the incredibly complex procedures of the proposed federal coal leasing program, it ought to be apparent that such an assumption is unrealistic. Furthermore, it is dangerous because it permits the Department to avoid focusing attention on the many instances in which delays could be decreased by assuming that such delays will not occur or will not create a problem.

The Department is in general to be commended for the wide range of alternatives discussed in this Chapter based upon innumerable assumptions and recognition of the limitations of quantifying all impacts. This is a basically realistic approach which should tend to support the legal defensibility of the Statement. It must again be noted, however, that far too much attention is paid to developing what are admittedly unrealistic "worst case" projections for environmental impacts. Although such projections may now have become common to environmental analyses, it is important in any environmental statement and in particular in one of such far-reaching implications as this Statement, that the Department repeat emphatically with each presentation of "worst case" data or environmental impacts that these extremes are very unlikely to occur and are presented only for the sake of bracketing and putting some kind of limit on what would otherwise be a hopelessly vague and unquantifiable analysis of environmental impacts. The Department has done this in several cases in Chapter 5. It can only be emphasized that in the final impact statement the Department should avoid any opportunity to give those who would be opposed to renewed federal leasing the ability to quote statements which would appear to insure that the impacts will be incredibly extreme. Such quotes are commonly used in public hearings and discussions with news media in an attempt to scare local officials and local citizens into believing that any coal development in their area will have devastating consequences.

Section 5.2.1. discusses land disturbance and reclamation in general terms. Although this section is helpful in finally putting into proper perspective the relatively small amount of disturbance which will be experienced in western coal regions relative to the rest of the country, it does contain some distortions and inconsistencies which should be corrected in the final impact statement.

On page 5-17, at the bottom of the first column, reference is made to estimates of land which would normally not be reclaimed. Curiously, this estimate considers land occupied by buildings and coal conversion and processing plants as lands most likely not to be reclaimed. It should be noted that these lands are fully bonded for reclamation and, in the sense that the salvage of the buildings might pay for the reclamation itself, have as good or better chance of being reclaimed by the appropriate state authority or contractors working with that authority, if necessary, than any other areas. Furthermore, concentrating on such areas as unreclaimable indicates that the Department would expect a larger proportion of surface directly disturbed by underground coal mining to be unreclaimed relative to that expected to be unreclaimed as a result of surface mining. There is no basis for such an assumption particularly since on the same page under "Reclamation Potential," the flat statement is made that all mined land will be reclaimed. It would seem that this statement is directly contrary to the assumptions which are the basis for the estimates in Table 5-8.

Also under the discussion of "Reclamation Potential," the statement is made that reclamation to maintain mined range land production levels could take as much as five to fifteen years. This statement is supported by citation to only one study which was done in 1974 before most large surface mining operations in the West had been studied or given adequate opportunity to demonstrate reclaimability under subsequently much more strict reclamation requirements on the state and federal levels. This weakly supported statement can result in a great deal of needless controversy concerning reclaimability as well as unnecessary expense and bonding difficulties for operators.

Later in the same Section (page 5-23, the sixth full paragraph), the statement is made that irrigation cannot be considered a solution for all mines in semi-arid regions simply because water rights are "usually not available." This statement is contrary to the experience of virtually every mine operator. Water rights are relatively expensive to develop or obtain anywhere in the West, yet we know of no mine operator who has been unable to acquire such rights either directly by purchase or by appropriation. Presumably this statement is based on a misconprehension of western water law and the realization that most states consider all or almost all of their watersheds to be fully appropriated already, which may be the case on paper but not in reality.

In the second paragraph of page 5-24, the incredible statement is made that the primary surface disturbance associated with underground mining is a lowering of the surface in the area mined (subsidence) to depths which vary from a few feet to "hundreds of feet." We believe it would come as a great surprise to anyone in the industry to be made aware of areas in which underground mining has resulted in subsidence of hundreds of feet. Even considering the very thick, shallow deposits in the Powder River Basin which often exceed 100 feet and assuming that somehow that coal might be mined by underground mining techniques not yet developed, it still defies the imagination to determine how such mining would lower the original elevation by hundreds of feet. Such seemingly innocuous statements made in such an offhand manner are just the kind of statements which will be taken out of context by groups opposed to any new coal operations in the West to try to scare those who might otherwise support new leasing into believing that the consequences of that leasing could be devastating. Furthermore, the very next paragraph of the Statement recognizes small

factors and discusses typical lowerings which indicate that the Department, although using small factors which are lower than those usually experienced, recognizes that the effects of subsidence in changing surface elevations are really not that serious.

On page 5-25 at the top of the second column the statement is made that increased mining might result in uncontrolled fossil collection. This statement, although really of minor environmental impact, is rather farfetched in that surface mine properties, for a variety of reasons, including the liability of the mine operator for the safety of the surrounding populace, are simply not left open for anyone to run across the property gathering fossils or otherwise having free access to pit areas and other disturbed lands.

The first two full paragraphs on page 5-26 discuss briefly potential conflicts between oil and gas development and coal mining. Unfortunately, it would seem to be the attitude of the Department that such potential conflicts will often be resolved by requiring that one resource be developed to the exclusion of the other. Such a decision will rarely prove necessary. In the northern Appalachian Coal Region, there have been hundreds of thousands of wells drilled over the past 100 years, yet that region has been and remains one of the prime coal producing areas in the country. Of course, it cannot be said that such dual development has never resulted in actual conflicts concerning recovery of one mineral or the other. However, the Department of Energy and the Bureau of Mines have developed techniques for mining through abandoned wells even in underground coal mines and there are many alternatives which can accommodate both methods of resource extraction without excluding one or the other in the same tract. This conflict is particularly important in the West, where many of the prime oil and gas producing areas in existence and that can be expected to be discovered will be in areas with important federal coal reserves. Any program which sets up an "all-or-nothing" battle between oil and gas interests and coal interests can only result ultimately in losses of these critical resources to both industries and the Nation as a whole.

On page 5-41 is a discussion of the projected consumptive water requirements in the Upper Colorado River Basin. This discussion concludes with an observation which is made for other regions to the effect that the Water Resources Council figures relied upon in the Statement, are probably exaggerated by a "double count" which includes general use, plus coal development. The Statement should present more reasonable water consumption statistics based on efforts to eliminate this double count. Failure to do so, even with the express recognition that the double count may exist, again gives critics of the coal leasing program and of western coal development in general the opportunity to capitalize on a very sensitive subject in the West by using exaggerated figures for water consumption to imply that municipalities and agricultural activity will be severely deprived of water if additional coal leasing occurs. Even though the Department tries to put the exaggerated water consumption into perspective by describing it also as a percentage of low-flow total water availability, it is felt that additional efforts are necessary to prevent this very sensitive subject from being misunderstood.

In the third full paragraph on page 5-53, the implication is left that Western coal uniformly has more radioactive material in it than Eastern coal. We know

of no authorities to support this implication, and would suggest that the Department clarify this to indicate that since both eastern and western coals vary widely in quality and trace element content, such a statement concerning radioactivity cannot be applied across the board to all western coal.

In Section 5.2.4.1, a lengthy discussion is made of the assumptions used in projecting the population increases due to the new federal coal leasing and the resulting socio-economic impacts. On page 5-83 (second column) and near the beginning of page 5-85, are comments which indicate that these impacts assumed are based on increases in population which combine short-term increases due to major construction as well as long-term employment in coal mines and supporting services.

Similarly, these impacts are based on figures which do not reflect any assumptions concerning the number of new people which would come into an area and the number of jobs related to new federal coal leasing which would be filled by present residents of an area. These two factors greatly exaggerate the socio-economic impacts of new federal coal leasing. This is particularly true in areas such as central Utah, where certain counties which would be directly impacted by new federal coal leasing are experiencing relatively high levels of unemployment or underemployment which would be alleviated by coal development without many of the related environmental impacts that occur when new residents move into a rather sparsely-populated area. Therefore, it is urged that the Department make a concerted effort in the final impact statement to relate current unemployment figures to influxes of population resulting from new federal coal leasing to develop not just the "worst case" picture again, but also to show to what degree the employment of existing residents in coal development projects and/or supportive services would reduce the projected environmental impacts. Many residents of the West are particularly opposed to any developments which would bring in large numbers of "outsiders." It is important to public support of the new federal coal leasing program and to the blunting of any opposition based on population increases that the Department put such population increases in proper perspective by indicating to what extent existing residents might reduce in-migration problems.

The population increase figures assumed by the Department are apparently in direct conflict with statements made on page 5-87, at the beginning of Section 5.2.4.2 to the effect that the principal source of labor for western coal development can be expected to be western workers in agriculture and to a lesser degree, in the construction industry. Here the Department is acknowledging that many existing residents of the West will be available to fill coal development-related jobs, thus making the exaggerated assumptions of the amount of in-migration even more unrealistic.

Again on page 5-94 (bottom of first column), reference is made to Table 5-54 as containing projected increases in population due to construction of coal development-related facilities. These comments recognize that part of the increase is due to a national surge in construction of new combustion facilities but it also notes that the data is based on the assumption of the possible development of significant numbers of synthetic fuel plants. Earlier in the Statement, the Department clearly stated that, in general, its environmental impact policies contained in Chapter 5 will be based on the assumption that the end uses of coal would, during the unforeseeable future, not vary signifi-

cantly from the present uses which are primarily for the generation of electricity and secondarily for conventional industrial boiler use with negligible or no synthetic fuel development. There would appear to be no justification for making an exception to this general observation in analyzing population increases. To assume significant population increases from synthetic fuel plants can be unnecessarily alarming to existing residents in regions to be impacted by any new federal coal leasing program.

In Section 5.2.4.4 (the second full paragraph on page 5-96), the basis for projecting fiscal impacts on state and local government agencies is described as being based on admittedly overstated population shifts which assume, incredibly, that all population shifts would be interstate. It continues to be confusing and frustrating for the Department to be making assumptions on one page and then contradicting the same assumptions with completely unjustified assumptions on the next page. Although it might be helpful to present the "worst case" scenario for physical impacts in order to avoid any criticism that the Statement is inadequate for failing to at least mention all possible impacts, it is basic to an objective analysis that the Statement also demonstrate what the Department considers to be the most likely situation so that published reports of the Statement or comments taken out of context by groups opposed to new federal coal leasing programs will not unduly alarm state and local governments to enact new taxes or increase existing taxes in preparation for problems based on wholly unrealistic assumptions.

Again, in Section 5.2.5.1, the analysis of transportation impacts deliberately sets forth only the worst case situation in which the vast majority of coal is moved by railroads with a variety of resulting impacts. The Department should try to develop again a "most likely" impact scenario because even where discussions are relatively brief and it is clearly stated that they are on the worst cases basis, a reader is likely to lose sight of that in attempting a detailed review of the bewildering amount of data contained in the Statement.

The last paragraph on page 5-113 makes the incredible statement that it is possible to construct major new rail lines without prior authorization from the federal government. In support of this statement is a footnote reference to a publication based solely on one section of the Interstate Commerce Act. We are aware of no major rail lines that have been constructed or that are proposed for construction which could avoid getting any authorization from the federal government. Even in instances where rail lines have been built as spur lines by coal companies, the construction was the subject of at least an environmental analysis or an environmental impact statement because it was associated with one or more coal mine developments which in themselves required some federal authorization. Therefore, the fears expressed in this part of the Statement would seem to be wholly unfounded and unnecessarily raise problems for new coal development in the West.

As is noted in the closing sentence of this Section, such considerations have far-reaching social and political implications which can only be considered by Congress and not in an environmental impact statement on only one of a number of activities which will affect the population growth and result in environmental impacts in the West. This Section vividly portrays just a few

of the many serious problems which would be created by any end-use control system so that it is difficult to understand why the Department is expending any effort in further consideration of this option.

Section 5.4.5 discusses diligence and continuous operation requirements. This section opens with a brief statement as to the advantages for strictly applying such requirements. It should be noted that the imposition of end-use controls would significantly decrease if not eliminate most of these advantages.

Also in this Section, the Department continues to stress the fact that many existing leases are not producing. Although it is not disputed that some of these leases have been and continue to be held for speculation, it should also be noted that it was only within the last five or six years that there was any real market incentive for the development of western coal in general. Furthermore, as has already been noted in the Statement many of these leases exist in units too small for economic development or in areas where development would be prohibited or unduly costly because of environmental considerations. To this list of constraints beyond the control of the lessees of non-producing leases must be added the fact that in the past five or six years "the rules of the game" for federal coal leasing and the stipulations under which mining could be conducted, if at all, have been changing constantly and significantly. In view of these facts and the statements made at the top of the second column on page 5-133 concerning the long lead time to the opening of mines even under the best of conditions, it can be seen that many of the leases which were not developed are and perhaps will remain so because of circumstances beyond the control of either the lessee and/or the Department.

Also on page 5-133, is a discussion of alternatives to the present diligent development and continuous operation requirements. It is puzzling why the Department of the Interior is concerning itself with such alternatives since it acknowledges at the beginning of this discussion that the authority to adopt any such alternatives is totally the responsibility of the Department of Energy.

Section 5.4.7 discusses the apparent preferred alternative definition for "maximum economic recovery" which requires that recovery be based on the mining of all collectively mineable seams in a property. While it is advantageous that a coal company have the option to mine all seams within one property rather than leasing separate seams to different companies, such an election should be based, as reflected in the third alternative discussed in this Section, on sound engineering practices which can be readily adapted to changing mining technology and economics. Any profit-making company such as a coal company which invests huge amounts of capital in its projects cannot realistically be expected to act to reduce the return on that investment by failing to mine the maximum amount of coal from each seam which can be safely and efficiently mined.

Section 5.4.8 discusses unsuitability criteria development. Although it is not expressly stated in this Section, it is assumed that the task force field studies and reports applying the draft criteria would be available to the public. These field tests as described in the third full paragraph on page 5-141 were applied in sections of Montana and Wyoming to indicate an exclusion of one-third to one-half of the available federal coal resources. This result is all the more

incredible and unrealistic when viewed with the fact that such exclusion did not apply all twenty-four unsuitability criteria even though some of the criteria have since been modified to permit more leasing. As discussed above, it would appear that the criteria, particularly that related to endangered species and wildlife habitat, is being applied most rigidly and without exceptions or compromises which have been so often experienced in past development impacts on such aspects of the environment. It is hoped that the Department will consider a wholesale review and revision of the unsuitability criteria to minimize the amount of coal which would be excluded while meeting the clear mandates of relevant legislation. In the final statement, the Department should include an analysis of the same areas to which the draft unsuitability criteria was applied so that the industry and public in general can have a clear concept of just how and to what extent that criteria in its final proposed form would exclude federal coal resources from development.

Chapter 6.

Chapter 6 summarizes many of the adverse impacts already discussed and deals primarily with mitigation of those impacts. A few of the statements made in this Chapter seem to conflict with previous sections of the Statement which are supposedly being summarized in this Chapter.

On page 6-3, the statements in the second paragraph of the second column suggest all environmental stipulations to be attached to a particular lease and mining plan would be determined prior to the lease sale. Earlier descriptions of the lease sale and mining plan approval process indicated that at both levels the Department would anticipate attaching special stipulations although most of the stipulations would occur prior to lease sale as is only fair to the lease bidders. This inconsistency should be clarified in the final impact statement.

On page 6-5 in the first column nine principal factors are listed which are to be considered in evaluating any impact of the proposed decisions discussed in this Statement. One of those factors is labeled "cost internalization" and refers to the extent to which costs of all adverse impacts can be borne by the producing company or passed through to energy consumers. This statement perpetuates the popular myth that large corporations should be made to bear the brunt of costs which would be completely absorbed by them. In fact these costs simply add to the price of the coal or the product produced by the coal such as electricity and so all of these costs can be expected to ultimately be passed through to the energy-consuming public. This should be made clear in the final Statement so that members of the public are not eager to adopt or support provisions which would unrealistically increase the price of the coal on the mistaken belief that in so doing their individual cost of energy consumption or of coping with the environmental impacts of coal development are reduced. It is true that costs may be shifted into the operator's internal cost structure, so that such costs might be hidden from the public but to suggest that doing so "relieves" the consumer from these costs is simply not true.

Near the bottom of the first column on page 6-7 is a statement to the effect that although consideration has been given to requiring operators to provide financial assistance to communities and government bodies through direct lease stipulations, the Department has determined that "it does not appear to be legally possible..." It is hoped that the Department will give no further consideration to such an obviously unlawful use of lease stipulations.

Chapter 7.

This Chapter reviews briefly the long term environmental consequences of the proposed coal leasing program.

Unfortunately, some statements in this Chapter tend to unjustifiably and unnecessarily exaggerate such consequences. For example, in Section 7.1.1.2 the long term effects of mining on soils is discussed with the conclusion that some areas of the West would require hundreds of years for natural processes to reestablish fertile soils. This must assume that the disturbance of those soils will result from activity which will be clearly in violation of SMCRA which emphatically requires the segregation of all soils and the return and stabilization of all soils on mined areas. Perhaps this statement is referring to soil disturbances resulting from general population growth which are not controllable by operating companies. Under such circumstances, it should be made clear that this is not the responsibility of operating companies.

Again, such extrere statements unnecessarily alarm all those who are already very concerned about increased coal development in the West and particularly agricultural interests. If space does not allow objective explanation of such statements then they should not be made in the first place. Such statements are even more incredible in view of other comments made in portions of the Statement. For example, in Section 7.1.2 (at the beginning of p. 7-3), it is flatly stated that mining simply would not be allowed in the first place on lands which could not be reclaimed and that bonding to insure reclamation would certainly continue after mining in areas where reclamation was particularly difficult.

In Section 7.1.3 (second full paragraph of the second column on page 7-3) a statement is made to the effect that prospects for higher wages in coal development areas would attract new people which would necessarily exceed the demand for labor and cause increases in unemployment. This statement would appear to be contrary to all experience to date with coal development in the West. The final impact statement should explain on what basis the Department asserts this statement since it is assumed in other parts of the Statement that coal development would severely decrease current unemployment rather than result ultimately in an increase of unemployment.

Section 7.2 contains a statement at the end of the first paragraph of that Section which indicates that the Department's policy of maximum economic recovery would somehow reduce the natural limitations on current mining technology which results in relatively low resource recovery in underground mines. It is obviously very important to industry to know exactly what methods the Department might contemplate to accomplish this. Surely the Department is not going to consider requiring, for example, in an existing mine which acquires a new federal lease, that a completely new or significantly changed method of mining be then used to result in increased resource extraction. If the method of mining currently being used is reasonable in view of present technology, there is no need to require the wasteful investment in all new underground equipment

to completely change to what may or may not prove to be a technology for higher resource recovery. In any event, a much more detailed elaboration of this suggestion is necessary in the final impact statement or else the suggestion should be eliminated entirely.

Section 7.3.3 discusses productivity of lands as affected by reclaimability. Again, as in Chapter 5, statements are made which indicate that even though existing laws require adequate bonds to insure the ultimate removal of all structures erected on lands disturbed by coal mining, it is assured that some of the structures will be left and the land so disturbed will never be reclaimed. It is not clear how or why the Department makes this assumption and it is certainly contrary to the express provisions of SMCRA.

In that same Section (on page 7-8), statements are again repeated to the effect that reclamation will require from five to fifteen years in most areas. These statements are based on studies which were either conducted when there was little if any information available to accurately assess reclamation efforts on western coal mines or before the implementation of the strict reclamation requirements of applicable state statutes and SMCRA. These statements should be modified in view of these developments if for no other reason than that such assumptions left uncontested can result in enormous burdens to operators by extending and increasing bonding requirements unnecessarily. Such costs are, of course, passed on to the ultimate consumer of energy and products produced from coal.

Coastal States Energy Company
February 12, 1979

Chapter 8.

Section 8.1 describes in part several memoranda of understanding which are or will be executed by the various federal agencies with often overlapping authority for various portions of the federal coal leasing program. Although no deadline is suggested for the completion and publication of these memoranda, it would surely be highly desirable that such memoranda be available to the public for comment before or at the time of publication of the final impact statement.

Respectfully submitted,

Jim A. Williams V.P.
COASTAL STATES ENERGY COMPANY

BURLINGTON NORTHERN

RESOURCES DIVISION

176 East Fifth Street
St. Paul, Minnesota 55101
Telephone (612) 298-2121

Director
Bureau of Land Management
U. S. Department of the
Interior
Washington, D. C. 20240

February 12, 1979

Dear Sir:

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Enclosed are the Resources Division of Burlington Northern Inc.'s comments on the Federal Coal Unsuitability Interim Criteria. Also enclosed is an extract from Mr. N. M. Lorentzsen's separate comment on the Draft Environmental Statement of the proposed Federal Coal Management Program.

Department of Interior representatives have stated that suggested changes in the criteria be within the constraint of existing statutes and regulations. Thus, while our Company might prefer wholesale revision of some criteria, we realize that the Department cannot seriously entertain such comments.

Consequently, our comments attempt to stay within the bounds of present legislation and generally recommend clarification of the criteria. We also want to urge that the criteria contain provisions requiring due diligence on the part of land management agencies responsible for applying the provisions of the criteria.

Because of its ownership of Western coal, Burlington Northern Inc. is interested in the wording and application of the unsuitability criteria. The Federal Coal Management Program can best be implemented if these criteria are clearly stated and fairly applied.

Yours very truly,

E. E. Thurlow
Assistant Vice President
Coal and Minerals

Attachment

STATEMENT OF NORMAN M. LORENTZSEN

PRESIDENT AND CHIEF EXECUTIVE OFFICER

BURLINGTON NORTHERN INC.

****

STATEMENT OF NORMAN M. LORENTZSEN

I am NORMAN M. LORENTZSEN, President and Chief Executive Officer of Burlington Northern Inc. My business address is 176 East Fifth Street, St. Paul, Minnesota 55101.

This statement is submitted in response to a request from the United States Department of Interior, Bureau of Land Management, for comments on the draft environmental statement for the Federal coal management program (DES).

General Information

Burlington Northern Inc. is a major railroad which, including its subsidiaries, serves some 19 States from Chicago through the Midwest and North Central Plains to the Pacific Northwest and from Denver to Galveston, Texas. Burlington Northern is also a natural resources company due, in part, to the land holdings of one of its predecessor companies, the Northern Pacific Railway Company. This statement will separately address transportation and natural resources aspects of the DES.

COMMENTS FROM THE PERSPECTIVE OF AN OPERATOR OF A MAJOR RAILROAD

From the perspective as a major Western rail carrier, Burlington Northern is vitally concerned with development of Western coal. In general, the DES greatly overstates environmental

impacts arising from the transportation of coal by rail carriers, especially in the West.

Coal Production Estimates

Comments on coal production estimates are limited to impacts arising from the Powder River Basin Region because it is this area which will have the most significant impact on Burlington Northern. Because of the limited time available to review this lengthy document, we have not attempted to analyze other regions.

Estimates of coal production from the Powder River Basin Region are considerably too high. The high probability placed on the "medium" level scenario for the preferred program (Table 5-2, page 5-10 of the DES) is overly optimistic. In planning for projected increases in volume of coal transportation, Burlington Northern conducts a comprehensive research effort to predict future coal traffic from the Powder River Basin. The basis for this planning effort is primarily utility demand as expressed by present and future customers beginning with rate quotation requests by utilities exploring the use of Powder River Basin coal. We also look closely at the plans of the mines we serve and the contracts in effect between mines and their customers. Such analysis convincingly leads to projections more in the range of the "low" scenarios mentioned in the DES rather than the "medium" level which is favored in the DES.

For example, our internal analysis predicts that total Powder River Basin coal production in 1985 will not exceed 175 million tons. This production may be as low as 133 million tons if full-control scrubbing requirements are promulgated by the Environmental Protection Agency. By contrast, the subject DES assumes a total of 205 million tons for the same territory in 1985 (Table 2-5, page 5-10).

Our projections are further substantiated by the most recent demand forecast (August 1978) issued by the National Electric Reliability Council (attached as Table BN-1). This forecast indicates a total demand from all Western Regions of 290 million tons in 1985. In view of these forecasts, the "medium" projections used in this subject DES are highly illogical.

A further illustration of wide discrepancies and overestimations occur in the supply-demand flows shown in Figures 5-4 and 5-5 (pages 5-107 and 5-108, respectively). These charts depict expected coal flows in 1985 and 1990. Figure 5-4 shows a total of 131 million tons in 1985 from the Powder River Basin. Figure 5-5 indicates production of 329 million tons in 1990. No evidence supports this tremendous 250% spurt in demand in a five year period. The coal volume predictions used in this DES do not appear to give sufficient weight to a number of factors which affect the competitiveness of this region's coal vis-a-vis other fuels as well as coal from other

regions in the U.S. There are a number of developments currently in the offing which are now significantly tipping the competitive balance away from Powder River coal as may well reduce drastically even the "low" scenario.

Among these developments are laws pertaining to pollution-control, especially the "best available control technology" regulations currently being formulated by the Environmental Protection Agency (EPA) as a result of the 1977 amendment to the Federal Clean Air Act. The proposed regulations would require that all new coal-burning power plants be required to install expensive scrubbers to remove at least 85% of the sulphur dioxide produced. This requirement would apply regardless of the sulphur content of the coal being used. The DES, page 2-10, does recognize some impact of full-scrubbing regulations but dismisses the threat as unimportant to the West. The legislative history of the Clean Air Act suggests to some that it was the intention of the Congress to foster the production of Eastern coal from underground mines at the expense of the Western surface mine production despite the fact that now the cheapest way for many utilities to reduce sulphur emissions is to use low sulphur coal from the latter source. If the new regulations go into effect, however, the attractiveness of Powder River Basin coal will be sharply diminished as higher-sulphur "local" coals could be used for mine mouth generating plants or would not have to be transported as far

to the power plant. This would no doubt result in major curtailment of planned mine expansion and new openings in the Western regions. The precise extent of this shift in fuel sources is not predictable until EPA settles on final regulations which it is required to promulgate no later than March 12, 1979 by court order. If they are comparable to those now proposed, the effect on Western production will be severe. Burlington Northern is presently planning on future coal movements to Texas, Arkansas, Oklahoma, Louisiana, Florida, Michigan, Indiana, Illinois and other eastern and southern states. Most of these moves are in jeopardy if low-sulphur coal is penalized by full-scrubbing provisions. As noted on page 2-10 of the DES, these utilities would likely turn to lignite or midwestern bituminous coal which, though higher in sulphur, are closer and thus cheaper to transport than coal from the Powder River Basin.

Legislation and regulations restricting surface mining could be a factor which will reduce production from the Powder River Basin. The Surface Mining Control and Reclamation Act of 1977 provides stringent guidelines governing surface mining of coal. These may well serve to restrict mining activities and reduce the amount of coal that could otherwise be recovered. Until implementation of regulations and state programs are established, it is not possible to predict what effect this Act will have on western coal developments. There is also concern that substantial delays could result from the complex environmental assessment, hearing and permit processes before mining could begin.

Financial considerations may also dictate against predicted development of Powder River Basin coal. Surface mining is capital intensive. Tremendous amounts of invested capital are needed just to begin operations. Mining firms may be very reluctant to invest in this region given the uncertainties surrounding the use and production of Powder River Basin coal.

Another potentially restrictive development is the recent proposal of the U.S. Department of Transportation that a 50-cents-per-ton surcharge be added to coal prices in order to help pay for (1) highway reconstruction at Appalachia to facilitate coal haulage and (2) rail-highway crossing improvements. If enacted into law, this would place a disproportionate burden on lower-priced western coal because of its relatively lower BTU-per-ton yield, and would affect the competitiveness price relationships with coal from other regions. Additional increases in western coal prices could be caused by the imposition of severence taxes by states. Western states are becoming much more sensitive to the depletion of coal reserves. Wyoming severence taxes are relatively low at present, but future tax increases would negate the competitive advantages of this coal-producing region.

Federal leasing policies will, of course, have some effect. Although the DES recognizes these policies as a constraint and points out the high dependency of the Powder River Basin coal

on Federal lease expansion, the projections reflect an overly-optimistic outcome of Government policy in this area.

As stated, further development of Powder River Basin coal is strongly dependent upon its competitive relationship with coals with a higher BTU content or from regions closer to major markets. This relationship can be sharply altered by new technology in mining and in fuel-burning processes, by improvements in the availability of other energy sources and by new laws and regulations which are being developed and implemented. Any projections, especially those beyond 1985, should recognize these high potentials for diminution in production.

IMPACT OF RAIL CARRIERS

Inflated estimations of coal production from the Powder River Basin will cause a significant overstatement of impacts from coal transportation by rail carriers. Impacts attributed to rail operations in the Powder River Basin region are exaggerated throughout the DES and presumably are high for other regions as well. Track capacity, gaseous emissions from combustion of locomotive fuel and other impacts are dependent on coal volume transported and the system for transportation. All of the above factors appear to have been calculated based on a unit train consisting of 100 cars. In actuality, most Burlington Northern unit trains are and will be comprised of 110 cars,

giving a train capacity of 11,000 tons. Ignoring for now differences in coal volume projections, the faulty assumption of a 100-car train leads to numerous erroneous conclusions. Track capacity, for example, is stated as the number of trains per day over a track segment before congestion occurs. Generally tonnage hauled is not considered. Thus, the amount of coal which could be transported over a given line segment per day would be greater in 110-car trains than in 100-car trains.

The DES indicates that certain rail links may have shortfalls in capacity to haul future coal traffic. Table 5-62, Potentially Constrained Rail Links, page 5-110, specifically identifies two Burlington Northern routes which allegedly will be unable to handle expected traffic volumes. Because reference No. 77 was omitted from the resource list at the end of Chapter 5, we are unable to analyze the assumptions which lead to the "capacity shortfall" conclusion. The DES does recognize on page 5-109 that the railroad industry has expressed willingness to expand line capacity to accommodate projected increases in coal traffic. Capacity on the Burlington Northern route east from Gillette to South Dakota border (through Clifton) is adequate for current traffic levels and additional track is planned for this segment in the near future. The second Burlington Northern route mentioned (from Frannie Junction to Cheyenne) is not on an existing or planned route for unit coal trains and, therefore, the expectation of a severe

capacity shortfall is puzzling. A portion of this route from Orin Junction to Wheatland, Wyoming is a coal route for which improvements to increase capacity are also planned in the near future. In light of the railroad industry's expressed willingness and plans to expand capacity of rail lines to meet projected coal traffic, Table 5-62 has only marginal significance. It would be more accurate and informative to include in this table information indicating track capacity after projected improvements have been made.

The DES purports to compare energy consumed by various modes of transportation in moving coal from production facilities to other locations on the coal cycle. See pages 5-116 and H-54. The estimations of operating energy expended by railroads and slurry pipelines are not only inaccurate but are completely out of proportion. The recent task report on coal slurry pipelines prepared by the Office of Technology Assessment predicts slurry pipeline operation would consume about 920 BTUs per net ton-mile versus only 400 BTUs for rail transportation of the same quantity. Office of Technology Assessment, 1978. A Technology Assessment of Coal Slurry Pipelines. Washington, D.C., Volume II, Part 2, page 205. Burlington Northern's own experience with unit coal train service indicates a figure slightly lower than 400 BTUs per ton-mile. The DES energy consumption rates of 670 BTU for rail carriers and 450 BTU for slurry pipelines are unsupportable.

The effect of these errors is cumulative. Overestimation of one aspect of rail operations creates error in the computation of other impacts and compounds errors that might be made in the latter area. This can be illustrated vividly by reviewing projections for air emissions from unit train operations. Fuel consumption is a major factor in determining gaseous emissions.

Paragraph H.5.1.3 Transportation, page H-34, states that typical train emissions have been estimated at 18.5 pounds of nitrogen oxides, 6.5 pounds of carbon monoxides, and 4.7 pounds of hydrocarbons per train mile of travel. Such casual use of national estimates does not provide a valid measure of locomotive emissions for a specific region. Fuel consumption and gaseous emissions are related to train speed, track grade, train load and many other operating conditions. This is particularly misleading when juxtaposed with the statement that transportation facilities are responsible for a large share of air pollutant emissions in many areas of the United States. This glib declaration begs the conclusion that rail carriers alone are responsible without help from automobiles, trucks, and other "transportation facilities."

A more reasonable and logical measure relates gaseous emissions to fuel consumption. The following factors were provided by the manufacturer of the locomotive most likely to be used in unit train service in the Powder River Basin region.

NO_x	33.33 gm/lb. fuel
CO	4.43 gm/lb. fuel
HC	1.31 gm/lb. fuel

At a fuel consumption rate of 400 BTUs per ton-mile, gaseous emissions from "long haul rail" would be as follows:

Emission	Corrected Long Haul Rail*	Table H-22 Long Haul Rail
NO_x	3.3 lbs./train mile	18.5 lbs./mile
CO	0.45 "	6.5 "
HC	0.13 "	4.7 "

It's safe to assume that all other estimates of emissions related to combustion of locomotive fuel in the DES are similarly exaggerated.

Table H-22 is also subject to criticism because without very careful review it is highly misleading. It purports to compare air emissions from various modes of transportation but does not compare equal volumes of coal transported by each. Fuel consumption used for calculation of emissions is also inconsistent with relative energy consumption for the various modes stated on page 5-116. It stretches credibility that one mode of transportation which allegedly consumes the same BTUs to transport a ton of coal as another mode (670 BTUs for rail and 680 BTUs for barge) suddenly consumes 2500 times the fuel volume per

* Calculation:

$$\left(\frac{400\ \text{BTU}}{\text{net ton mile}}\right)\left(\frac{11{,}000\ \text{net tons}}{\text{train}}\right)\left(\frac{1\ \text{lb. fuel}}{19{,}750\ \text{BTU}}\right)\left(\frac{x\ \text{gms pollutant}}{\text{lb. fuel}}\right)\left(\frac{1\ \text{lb.}}{2200\ \text{gms}}\right)$$

unit of coal transported (50 gallons of fuel to transport 10,000 tons one mile by rail versus 0.02 gallons of fuel to transport 10,000 tons one mile by tug).

One transparently incorrect conclusion regarding environmental loadings from coal transportation is the assumption that coal slurry pipeline operations would not contribute to air emissions. See, for example, Tables H-65 on page H-84 and H-89 on page H-108. Although a pipeline is powered by electricity and may not visibly produce emissions along its line, generation of that electricity does cause air emissions. Moreover, these emissions are localized around power generation facilities. Failure to include emissions from electricity generation necessitated by slurry pipeline operation, distorts environmental impacts of the various modes of transportation.

Based on those factors indentified above, all estimates in this DES of air emissions from transportation as they relate to the Powder River Basin are suspect and should be given little weight. Regarding rail carriers, emission factors from locomotive combustion are inaccurate, fuel consumption estimates are contradictory, unit train length was shortened and total coal to be transported is excessive. The bottom line is not a "worst case" estimate of impact, but a totally improbable result.

COAL SLURRY PIPELINES

The DES makes only passing reference to slurry pipelines because certain constraints on slurry transportation are unresolved. This avoidance of slurry pipeline issues is hardly justifiable in a presentation which undertakes to forecast such nebulous topics as coal demand and effects of coal demand in 1990. Slurry line proponents themselves represent that slurry line construction is a certainty in the early 1980's.

In light of the serious environmental risks posed by slurry pipelines - especially the diversion of Wyoming's scarce water resource - careful treatment of these environmental impacts seems required.

COMMENTS FROM THE PERSPECTIVE OF AN OWNER OF WESTERN COAL PROPERTIES

Many years ago, the former Northern Pacific developed a surface mine at Colstrip, Montana, to provide coal for its steam locomotives. In 1971, the Company voluntarily initiated a reclamation program for the mine site although it was under no legal obligation to do so. This program, which involved approximately 1,000 acres of land, has now been completed and is generally regarded as being successful.

Burlington Northern supports reasonable Federal legislation and regulation which are designed to encourage energy

development consistent with sound environmental considerations. Wherever possible, we believe the States should be permitted to administer the specific programs within the national policy.

Burlington Northern does not mine its coal properties at the present time; instead through the years it has leased approximately one-half of its subbituminous and lignite coal reserves to other companies under long-term contracts. The following comments are from the perspective of an owner of fee and mineral rights interests in Western coal that is intermingled with Federal coal properties.

President Carter's national energy plan, announced in April, 1977, listed seven National energy goals to be achieved by 1985 to end this Country's dependence upon foreign oil. The DES, in response to the President's Plan and existing legislation, such as the Department of Energy Organization Act, the Surface Mining Control and Reclamation Act, and the Federal Coal Leasing Amendments Act of 1976, includes an elaborate regulatory framework for implementing a Federal coal leasing program to meet the expected and dramatic increased demand for principally low sulphur Western coal. The DES also adds certain environmental criteria for excluding Federal lands from coal leasing which are not mandated by the numerous Federal laws listed on Table 1-5 of the DES and it provides a comprehensive plan for Federal management of coal, including consideration and possible restrictions on where the coal may be sold.

The difficulty in centralizing the decision-making machinery in the Federal Government with respect to coal developments, which is admittedly a long-range process, and coal management can perhaps best be shown by two recent and conflicting developments. The problem in Iran today emphasizes the need to minimize the Nation's dependency upon imported oil. That unsettling event and others like it that may occur in the future cannot be predicted with certainty. Secondly, the newspapers have reported recently, including The Wall Street Journal on February 7, that the electric utility industry is not expanding as rapidly as had been expected. Among the reasons given for the lower expansion rate is the conservation of energy and the utilities' need for substantial new capital, environmental requirements, problems in obtaining rate increases, and new Federal requirements for scrubbers to meet air quality standards. These reports suggest that the demand for coal, especially low sulphur Western coal, will not be as great as stated in the DES. These two developments, and others like them, prove how difficult it is to plan in detail the systematic development of coal production and marketing for the entire country.

We do not expect that Western coal production will increase as rapidly as the projections contained in the DES. Therefore, we believe that a less elaborate regulatory scheme for Federal coal leasing can be developed which can be more responsive to the changing demand for Federal coal while at the same time

protecting the public's interest in competitive bidding, the environment, and expeditious development of Federal leases. We do not believe that it is necessary or advisable for the Government to inject itself into the marketplace for Western coal or to add another layer of discretionary environmental regulations on top of the existing environmental regulatory framework.

The initial step of the "preferred program," described in the DES, consists of land use planning utilizing the planning systems already in existence in the Federal land management agencies. In this process, there would be a determination of the lands unsuitable for mining and a determination of lands considered more valuable for other uses. We believe it is imperative that the coal industry and private mineral interest owners be consulted during this planning process, in addition to the State Governments, because of the substantial effect the selection process will have on adjacent or contiguous private and State owned reserves. If Federal reserves are withdrawn from development without sufficient consideration of adjacent reserves or effects on those reserves, the remaining parcels may be fragmented or too small to be economically developed. For example, Burlington Northern has substantial ownership checkerboarded with Federal lands in Montana and North Dakota. Those reserves cannot be considered in many instances to be logical mining units without the adjacent Federal coal and the same

would be equally true for the Federal reserves if our coal is not developed. Thus unilateral Federal decision that the Federal coal is unsuitable for mining could make the mining of our coal uneconomic. To deny the opportunity to share in this decision-making process would be tantamount to confiscation of our property without compensation.

Congress in recent years has enacted several major pieces of legislation which are designed to protect the environment, not the least of which is the Surface Mining Control and Reclamation Act of 1977, which is commonly acknowledged as being a comprehensive environmental protection plan. Since its passage, the issuance of a Federal coal lease does not guarantee the lessee the right to mine because it must still obtain a permit under the Act and comply with its stringent requirements. Burlington Northern recognizes that the Department of Interior in formulating the new program must comply with certain statutory provisions contained in that Act and other statutes which restrict its freedom of choice in specific areas. Nevertheless, several of the 24 criteria dealing with environmental matters contained in the DES, any one of which can determine unsuitability for leasing, have been added at the discretion of the Department of Interior. In addition to these criteria, there is a further selection process in which trade-offs on a site-specific basis are considered between coal production and other potential uses. Among the uses which would be chosen as being clearly superior

to coal production are prime recreation sites or campgrounds. We question whether adding non-mandated environmental criteria is appropriate in view of the existing comprehensive statutory and regulatory safeguards. We also believe that several of the criteria should be modified to provide specific ascertainable standards for applying the criteria to minimize confusion and administrative delay.

Turning more specifically to certain of the 24 criteria, it is proposed that lands recommended or being studied for inclusion in National Recreation Areas, the National Park, National Trails, National Wildlife Refuge, National Wilderness Preservation and National Wild and Scenic Rivers Systems would be excluded from coal leasing. We believe that these lands should not be so arbitrarily excluded, or, alternatively, that the resource and applicable criteria should be considered as part of the normal study and planning process for such lands. The proposed environmental impact statement for any Federal lands within such areas should not be the principle vehicle for determining whether the Federal lands should be excluded from the leasing program. Further, the Company believes that the Federal land management agencies should exercise due diligence prior to nominating and including additional Federal lands in the Wilderness system.

Similarly, the Company believes that it would be advisable to make the DES more specific to exclude scenic areas and historic lands and sites from coal leasing only if the areas are

actively under consideration for such classification. Criteria should be included to aid in determining which Federal lands are suitable for study as "natural areas," "National Natural Landmarks" and for determining "roost and concentration areas" for bald and golden eagles and falcon cliff nesting sites. The DES should also include defined terms for "high priority habitat" and "high Federal interest" for purposes of the criteria relating to migratory birds. Specific standards for determining areas deemed unsuitable for coal mining by Federal and State fish and wildlife agencies should be added to the DES.

With respect to the criteria relating to floodplains, the definition of "riverine" floodplains should be limited to streams which have a perennial flow of a specified minimum discharge. This would permit development of Federal lands which are dry or ephemeral streams since there would be no local dependence on the stream for irrigation, fisheries, water supply or navigation.

We believe that the criteria for establishing a buffer zone of Federal land adjacent to State lands designated by a State as being unsuitable for coal mining should be combined, and suitable guidelines added for selecting such lands.

Under existing mining reclamation laws and regulations, the mining of coal generally will represent only a temporary disturbance of the surface. Accordingly, we believe it is appropriate for the criteria set forth in the DES to include guidelines for identifying Federal lands having prime farmland soils and to

exclude only lands with soils which are not reclairable that are actually under cultivation or planned for cultivation within a prescribed period of time. We believe that the portion of the criteria on alluvial valley floors relating to lands outside such valley floors which would materially damage the quality and quantity of surface and underground water systems supplying the alluvial valley floors should be administered by a qualified organization such as the U.S.G.S. Water Resources Division, the Soil Conservation Service, private consulting concerns, or by means of joint studies by such entities.

The criteria relating to reclaimability provides that as information becomes available, Federal lands found not to be reclaimable pursuant to the Surface Mining Reclamation Act standards can be withdrawn. We believe that Federal lands should be judged by the data in existence at the time leases are entered into.

CONCLUSION

In summary, the draft environmental statement for the Federal coal management program as it relates to Western coal has greatly overestimated future production from the Powder River Basin region and perhaps from the entire Western region. Because of this overestimation of coal production and the use of erroneous fuel consumption and emission factors, the DES exaggerates environmental loadings and other impacts from rail transportation of Western coal.

The Federal coal Management program itself should be redesigned to involve private landowners in the planning process at an earlier time than proposed. Environmental criteria used in site selection should be more clearly and definitively stated and limited to implementing existing statutes, preferably under the jurisdiction of one designated agency.

To provide a more accurate picture of Western coal production and transportation the final environmental statement should reflect the changes outlined above.

Respectfully submitted,

Norman M. Lorentzsen
Norman M. Lorentzsen
President and Chief Executive Officer

Dated: February 12, 1979

TABLE BN-1

WESTERN STEAM COAL
(Excl. Lignite)

(000 Tons)

Year	NERC Demand[1]
1979	161,412
1980	193,137
1981	211,441
1982	231,812
1983	250,056
1984	267,972
1985	290,603

[1]NATIONAL ELECTRIC RELIABILITY COUNCIL - Annually NERC issues its estimates of fuel consumption for electric generation. These figures are based upon current NSPS. They are for coal produced west of the Mississippi.

PEABODY COAL COMPANY
1800 L STREET, N. W., SUITE 1220
WASHINGTON, D.C. 20036

HARRISON LOESCH
VICE PRESIDENT
GOVERNMENT RELATIONS

February 13, 1979

Office of Coal Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, D. C. 20240

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Gentlemen:

Peabody Coal Company wishes to provide comment on the Draft Environmental Statement (DES) on the proposed Federal Coal Management Program published December 15, 1978. The comments contained herein have been reviewed by the Environmental Quality, Legal, and Corporate Planning divisions of Peabody, as well as our Rocky Mountain Division staff.

While the Draft Environmental Statement appears to be adequate in most respects, Peabody Coal Company finds a number of specific deficiencies which are described in the attached chapter-by-chapter review.

In general, and with the corrections we note, we believe the statement is sufficient to meet the requirements of NEPA. However, we want to take this opportunity to comment on some aspects of the proposed coal management program (hereinafter called "preferred program") which we find troublesome and which may render the program unworkable in its present form.

The principal difficulties with the preferred program, from Peabody's point of view, include the following:

1. We believe the exclusion of early expressions of interest from potential bidders unnecessarily and greatly compounds the work requirements of the affected agencies, with resulting manpower and budgetary implications. It will also consume more time than would be necessary under a more "focused" study effort.

2. The "unsuitability" and "resource trade-off" tests for prospective coal lease areas will be conducted in the absence of technical and market information which only industry sources can provide.

3. The proposed intertract bidding process does not seem to account for relative differences in the costs of extraction, processing, transportation and reclamation when comparing potential lease tracts.

4. The proposed application of the unsuitability test and the land-use planning requirements on existing leases may not have a basis in law, nor would the imposition of end-use requirements on new leases seem to have a legal foundation.

5. The utilization of regional production goals has no rational relationship to coal market circumstances. Moreover, the goals do not seem to be the driving force behind the proposed leasing system, but merely planning targets.

6. The imposition of maximum economic recovery (MER) rates, as suggested in the DES, will require the Department to predetermine a rate of return on a proposed mining venture. By stipulating recovery of "all coal seams which are collectively profitable," the Department will have to establish a margin of profit for mining ventures on new leases. This constitutes a major change in government policy with market and productivity consequences.

Some of these program deficiencies can be corrected without major revision of the preferred alternatives. We urge the Department to consider altering the sequence in which certain statutorialy-mandated functions are carried out. Rather than complete the land-use planning and unsuitability tests prior to tract selection, we believe the Department should accept expressions of interest from the private sector, on a tract-by-tract basis, prior to completion of the land-use planning phase. This will substantially reduce the number and scope of potential coal areas for which detailed coal-related environmental information is needed. Furthermore, by withholding final judgments on the suitability or unsuitability of prospective lease areas until after specific lease tracts have been selected, and more detailed analysis is afforded, the possibility of overcoming or mitigating some of the unsuitability standards would be substantially improved.

Along with the refinements suggested in our detailed comments, these two changes -- both well within the permissible limit of current law -- would go a long way toward

making the preferred program workable. Without the suggested change in sequence, and the corrections noted, we cannot envision the program functioning in a manner that will fulfill the President's directive to "manage the coal leasing program to assure that it can respond to reasonable production goals."

We appreciate the opportunity to comment on the proposed Federal Coal Management Program and urge your careful consideration of the comments and recommendations contained herein.

Very truly yours,

Harrison Loesch

Harrison Loesch

Attachment

HL:dl

CHAPTER ONE: INTRODUCTION AND BACKGROUND ON THE COAL MANAGEMENT PROGRAM

Peabody has found the background chapter to be historically correct, for the most part. The background information is presented in a succinct and readable form, so that readers not familiar with federal coal management can gain an elementary understanding of the program. The list of "Federal Laws Affecting Coal Development and Energy Conversion" (Table 1-5, page 1-17) does not list the Federal Land Policy and Management Act (FLPMA) or the Surface Mining Control and Reclamation Act (SMCRA), though both statutes are mentioned elsewhere in the statement.

Section 1.3.2 (Interagency Relationships in Federal Coal Management) fails to mention the role of the Department of Justice, which under the Federal Coal Leasing Amendments Act (FCLAA) must approve each coal lease, prior to issuance. The Department of Justice is also obligated by statute (Section 8 of FCLAA) to report annually on the status of competition in the coal industry, with particular emphasis on federal coal leasing. An argument can be made that the absence of new leasing or unnecessary constraints on new leasing would have significant anti-competitive implications. The statement fails to discuss this issue, and does not mention the studies and approvals required by law which deal with the anti-trust questions involved in any federal coal management program.

CHAPTER TWO: THE NATIONAL ROLE OF WESTERN AND FEDERAL COAL

The discussion of the role of Western, including federal, coal is reasonably objective, providing some data on the effects of various modes of federal coal management (i.e., issuing PRLAs, production from existing leases, etc.). Peabody has only a few specific comments to offer.

The tables on pages 2-28 and 2-29 (Tables 2-17 and 2-18) providing production and consumption projections for Western coal do not match. For example, in the 1985 high case, consumption of Western coal is estimated at 519.9 million tons, while production in that instance is estimated at only 507.3 million tons. We assume the difference in based on the fact that the production figures do not include the states of Arizona, Washington and Alaska. Perhaps the definition of "Western coal" in the consumption table (Table 2-18) should be clarified in the final environmental impact statement.

One of the more serious difficulties in the chapter concerns the estimates of time required to bring a lease into full production (2.8.1, page 2-43). The statement estimates that mine plan development will take from one to three years. In fact, new requirements under SMCRA may require at least one full year of data collection before an application can be submitted. Given seasonal work difficulties,

and the time required to synthesize the collected data and complete engineering, it will take approximately eighteen (18) months, at a bare minimum, to prepare a mine plan for submission to the government.

The statement also estimates only one year for mine plan approval by the various regulatory authorities. The implication is that only "in some cases" does the approval process consume more than one year. Past experience has shown that approval within one year has been the rare exception rather than the rule. An average approval time of eighteen (18) months might be more realistic.

The estimate of time consumed between approval and "full operation" of a new mine is given as two (2) to three (3) years. This period of time may be reasonable if one is estimating the start of production, but it will require another two (2) or three (3) years from initial production to achieve the full planned level of production, especially for the larger Western mines.

A more realistic time frame from lease issuance to full production might be seven (7) to ten (10) years, rather than the four (4) to seven (7) years provided in the statement. The recent study on federal leasing conducted by the General Accounting Office* (GAO) provides an estimate of four (4) to fifteen (15) years from lease to full production.

Any miscalculations in the average time required to

*U.S. Coal Development: Promises - Uncertainties, U.S. General Accounting Office, September 22, 1977, page 4.11

bring new federal coal leases into the nation's energy matrix will obviously skew the production estimates listed in Chapter Two (Tables 2-20 and 2-21) and the impacts of coal production provided in Chapter Five of the statement.

We strongly suggest a revision of the time estimates of the post-leasing activities.

CHAPTER THREE: PREFERRED COAL MANAGEMENT AND ALTERNATIVES

General Comments

In general, Peabody finds the Draft Environmental Statement (DES) and Chapter Three, in particular, to be a succinct description of the preferred program and its alternatives. Drafters should be complimented on a well-organized exposition of the proposed program.

The most serious failure of the program description is the lack of detail concerning the actual process for ranking and selecting lease tracts (3.1.1.1) after the land-use planning activities have been completed. Another shortcoming is the absence of definition concerning the establishment of maximum economic recovery requirements (3.1.1.2). As a result of these and other omissions, potential bidders are provided insufficient information about the circumstances under which new federal coal leases may be offered.

The statement does not provide estimates of the time required to fulfill each of the various steps in the leasing process. We are assuming that because of the new land-use planning process proposed by the Bureau of Land Management,

the implementation of a new leasing system, described as the preferred alternative, will take a considerable amount of time. There are at least two (2) environmental impact statements in the process: one for land use, and one for activity planning. With the other steps involved, the entire process could consume years, rather than months. If the leasing process is as lengthy as it would seem from the present description, then the impacts associated with the new system for the 1985-1990 time frame may be overestimated. We hope the final statement will provide an indication of the time frames involved in each step of the proposed process for leasing coal.

Specific Comments

3.1.1 - The Preferred Program

Peabody finds the major elements of the preferred Federal Coal Management Program appropriately described, though there is little indication as to who would carry out the functions listed in the flow chart (Figure 3-1, page 3-3). More information about which offices (BLM state offices, BLM Washington office, Secretary's office, etc.) are to carry out each of the major functions would help reviewers better understand the procedural aspects of the program.

3.1.1.1 - Planning Systems

The principal weakness of the discussion on land-use planning is the absence of definition concerning the screening process for coal leasing. There is no serious misunderstanding about lands not containing coal reserves with "high to moderate development potential" or lands declared unsuitable

for leasing under the provisions of SMCRA, though we have serious reservations about the latter. However, the statement that areas which "are considered to be of higher value for other uses as determined by multiple-use, resource management trade-off decisions" would be eliminated from further consideration for leasing does not provide an understanding of either the criteria or the mechanism by which comparative land-use values are to be judged. Clearly, economic considerations are not prominent in the trade-off, since much of the federal land containing coal has no other potential use rivaling coal development on economic grounds. Hence, the "higher value" must refer to environmental, social, or aesthetic considerations which are not spelled out in the DES.

Unsuitability

Detailed comments on the unsuitability criteria proposed in Chapter Three will require more time than is now afforded, and Peabody Coal Company will await formal rulemaking proceedings to provide such comment.

In a general sense, however, we find the criteria seem to exceed the intent of Congress (SMCRA). Indeed, if tables in Chapter Five (page 5-154) are any indication, the criteria would prohibit coal leasing on an almost wholesale basis.

While there is some merit in reviewing potential lease areas for "unsuitability" before the lease is executed, it should be noted that relatively little technical information is available until a mine plan is actually developed. Hence,

until the latter stage, there is little or no available information which could or would form the base for mitigation of harmful effects of mining -- mitigation which would render an area entirely suitable for such activity, even though pre-lease information might lead to the opposite conclusion.

More importantly, by placing the unsuitability test in sequence prior to an expression of area interest on the part of industry, and, for that matter, even prior to any preliminary tract selection by the Department, the workload is grossly and unnecessarily compounded, especially with the detailed tests which would be required by the use of the proposed criteria. Moreover, the unsuitability test may well be reapplied during the mine plan review phase after the lease is issued. Hence, the earlier unsuitability review could be duplicative.

Activity Planning

In the paragraphs describing Activity Planning, there are no criteria provided by which preliminary tracts would actually be selected. The statement says that the selection process would be "based primarily on considerations of technical coal data resource conservation considerations and surface ownership patterns." Further details are provided in Section 3.2.2.1, but in neither instance does the statement indicate how the considerations would be used to establish and delineate specific tracts. For example, we cannot determine whether "consideration" of land ownership patterns refers to Interior's stated policy of leasing only in areas where the government (or mining companies) owns

the surface, or whether it refers to leasing to form logical units for mining in conjunction with fee coal or state-leased coal.

While Section 3.2.2.2 does indicate that comments will be sought on the relative merits of individual tracts under consideration for leasing, there is little indication of the weight to be given to various tract characteristics (i.e., low sulfur content vs. wildlife habitat).

Section 3.2.2.2 also implies an effort to disperse rather than concentrate leasing. The statement is made that "selection of the first tract (in an area) might preclude selection, or lower the priority of, other highly ranked tracts." The long-term effects of a policy of dispersing coal development in the West could increase coal transportation costs, create socioeconomic difficulties, and exacerbate environmental problems (longer spur lines, duplicated service and support facilities). The implications of such a policy deserve additional analysis.

The process of ranking potential tracts on a region-wide basis "and not separately within each land use planning area," assumes that all land-use planning areas within the region have completed plans, with all the required NEPA statements, etc. Ranking and comparing tracts in a region is relatively meaningless if significant number of tracts (not otherwise declared unsuitable) are unavailable because

the planning is incomplete or inadequate. An early indication of market interest could be used to help schedule planning activities on the public lands. The preferred alternative precludes such indications until well after planning is presumed complete.

3.1.1.2 - Regional Production Targets

Perhaps the most troublesome aspect of the statement, and the preferred program itself, is the reliance on regional production targets as the driving mechanism for the program. The establishment of targets in the so-called "major production regions" implies that the coal market is cordoned into neat, autonomous market areas. In reality, there are many instances when coal from the West must compete with Midwestern and Appalachian coal, and even coal from Australia and South Africa. To discern in advance, as the preferred alternative proposes, that certain levels of production are desirable in each region simply flies in the face of reality. It will be disruptive in the coal market, impose additional, artificial costs in an already marginal industry, and it would seem to raise serious questions about the federal role in determining the level of economic activity in the various states. None of these issues is raised in the statement.

Moreover, even presuming the efficacy of setting regional production targets, it is not clear that such targets would in fact serve as the driving mechanism for federal coal leasing.

Not only does the statement indicate that the targets set by the Department of Energy would be subject to adjustment by Interior (3.1.1.2), but that such targets could be adjusted according to the available tracts deemed to be suitable for leasing. Section 3.2.3 states that "the regional ranking and selection process should consistently indicate the optimum tracts for the desired level of development ..."

Previously offered, but unleased, tracts are an obvious indication of market miscalculation and the need to adjust production targets. But the statement implies that, in many cases, the targets will be adjusted to meet the number of available, suitable leases. If that is the case, then the production targets serve only as a planning guide, not as the piston for coal lease sales. In any case, the role of the regional production targets would seem to require further description in the final impact statement.

Maximum Economic Recovery

The DES provides scant information about the maximum economic recovery (MER) requirements. Section 3.1.1.3 states only that such requirements must be set prior to a lease sale, implying that MER rates are set on a piecemeal, lease-by-lease basis. Section 3.3.6 indicates the Secretary has previously decided to require that MER rates be set in a way that "all coal seams which are collectively profitable must be mined, taking into consideration social and economic costs." While we understand the need to eliminate so-called

"high-grading" of coal seams, the determination of collective profitability of multiple seams is not a realistic possibility at the pre-lease stage. At that point, no selling price has been established, and mining cost calculations must await detailed engineering after a lease has been issued.

In its present form, all MER calculations must be established using hypothetic mining methods, cost calculations and selling prices. In "averaging" the return per ton, the Department is, in essence, establishing a "profit-control" system. We suggest further consideration of the so-called prudent man test as a means of preventing "high-grading" and assuming conservation of the resource.

3.1.1.5 - Management of Existing Leases

The DES states that the same land-use planning requirements which are to be applied to new leases would also be applicable to existing non-producing leases, "subject to valid existing rights."

We have reason to doubt the legal validity of imposing land-use planning requirements such as those described in Chapter Three on existing leases. The issuance of a lease would seem to be a determination of a land use; alternative and preemptive uses determined at a later date would seem to violate the leaseholder's right, so long as the lease remained valid. We suggest that the final EIS qualify applications of new planning requirements to existing leases, or at least shed light on the legal vagaries involved.

Discussion of the Alternatives

The statement lists six (6) alternatives in addition to the preferred alternatives:

- 3.1.2 - No Federal Leasing
- 3.1.3 - Process Outstanding Preference Right Lease Applications (PRLAs)
- 3.1.4 - Emergency Leasing
- 3.1.5 - Lease to Satisfy Industry's Indications of Need
- 3.1.6 - State Determination of Leasing Levels
- 3.1.7 - Leasing to Meet DOE Production Goals

In general, the description of the various alternatives is adequate. However, there is little or no discussion of the legal basis for ranking PRLAs (3.1.3) or limiting issuance of PRLAs to the so-called "bypass" or "existing operations" criteria (3.1.4).

Also, the description of Industry's Indications of Need alternative (EMARS II) states that such a system could lead to excessive leasing (more leasing than is needed by the market) because of speculative interest in leases. The description fails to add that current requirements for diligent development preclude the speculative holding of leases.

We also call into question the statement on page 3-23 that "industry nominations ... resolve the question of leasing levels" in the alternative proposal to use industry's indications of need as the mechanism for coal leasing. Nominations serve only as a means of locating potential lease tracts and providing a preliminary indication of market demand. In

such a system, the actual acceptance of successful bids sets the level of leasing, not the act of nominating potential tracts.

3.2.4.4 - Intertract Bidding

Intertract bidding, as described, provides for the comparative analysis of tracts on the basis of the amount bid per ton of coal, with some weight given for differences in coal quality. However, the system, as described, does not account for differences in environmental circumstances or differences in the costs of extraction, processing, transportation, and reclamation, since detailed engineering does not occur until after lease issuance. As a result, no true comparison between tracts is possible prior to leasing.

CHAPTER FOUR: DESCRIPTION OF REGIONAL ENVIRONMENTS

The description of the various regional environments in which federal coal exists are understandably general. We are not certain the descriptions are especially meaningful for decision-making purposes, but it is understood that additional studies of a more site-specific (regional) nature would be completed before leasing commences.

We have no objections or specific comments about Chapter Four except the following:

The tables showing population and economic characteristics for the respective regions (Tables 4-1 thru 4-12) list employment in the various sectors in terms of thousands of employees. This appears to be a typographical error which should be corrected.

It would be helpful if the drafters provided references for the demographic data in this chapter. Perhaps the most useful data in this chapter are the socioeconomic characteristics, especially employment. Yet, without references, reviewers cannot tell how timely or accurate the data is. It is apparent that some of the data, especially coal mining employment, is not current, at least for the Powder River Coal Region.

CHAPTER FIVE: REGIONAL IMPACTS OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

General Comments

Chapter Five, Regional Impacts, is general in nature and very non-site-specific. As a result, the usefulness of the chapter relative to future lease development is limited.

5.1.2 - Assumption and Analysis Guidelines

The assumptions used in the analysis (5.1.2.1) are not realistic. The Department has assumed there will be no delays specifically related to compliance and implementation of current best practicable pollution control technology related to air and water pollutants. The assumption is invalid since the terms used, BPT and BACT, as used in the statement, have not been adequately defined.

5.1.3 - Impact Estimation

This particular section divides impacts into three (3) general categories: (1) those where knowledge of the specific location can be stated in specific terms; (2) those where

there is a lack of adequate data to qualify the impacts; and (3) those where there is a lack of consistent regional baseline data. The lack of available information points out the difficult task of developing and implementing the Federal Coal Management Program as outlined in the draft statement. It appears the lack of data may require the coal leasing and coal operating companies to delay planning until the federal agencies have completed their studies.

5.2.2 - Physical Impacts and 5.2.2.6 - Water Impacts

As a result of the lack of specificity in the draft statement, it is difficult -- if not impossible -- to evaluate this section. The terms are very general in nature, and it is difficult to assess whether the tables are adequate or meaningful.

-- Table 5-44, page 5-74, "Comparison of Potential Primary Productivity Loss." This table needs clarification and references. In addition, Tables 5-42, "Nitrogen Oxide Emissions," and 5-43, "Hydrocarbon Emission," are difficult to interpret. A statement should outline the criteria on which the emission factors were generated and what kind of emissions would impact what areas.

-- Table 5-46, "Potential Threats to Endangered Species of Coal Regions," is extremely misleading. The column labeled "Most Serious Threat" to the endangered species is purely conjectural unless better referenced. It appears the most serious threat specifically related to strip mining is unfounded. For example, it states that mining is

the most serious threat to the gray bat. This is unfounded, especially when the animal's normal habitat is limestone caves. Another endangered species, the black-footed ferret, is said to be threatened by strip mining. In fact, farming and farming practices are considered to be the principal cause for the degradation of the habitat. This also applies to the Utah prairie dog. Thus, Table 5-46 describes severe negative impacts as if they are solely resulting from strip mining.

-- Table 5-73, "Lands Unsuitable Field Test Summary." Without knowing tracts of land to be studied, it is difficult to determine the total impact of the suitability criteria on the total coal resource base. It appears, if these studies are representative, that most of the coal would be removed from federal coal leasing. It also appears, without an extensive environmental data base, that 100 percent of the coal in Montana would not be considered when using the "historic lands" criteria. In Utah, 64.8 percent would be removed from consideration as a result of "high interest habitat." Based on these conclusions from four study areas, and if they are to be considered representative, significant amounts of coal would be removed from development.

As a general note on Chapter Five, the impact section does not describe beneficial impacts from mine development;

and does not discuss the economic benefits received from coal severance tax money. In addition, the statement should also describe the positive economic benefits of developing coal tracts within a particular region.

CHAPTER SIX: MITIGATION OF MAJOR ADVERSE IMPACTS

Peabody has found a few errors and has a number of comments about the chapter on mitigation.

The first introductory paragraph on page 6-1 contains the statement that "The impact analysis in the previous chapter (Chapter Five) does not include those mitigating measures required by law or regulation" (emphasis added). As written, this is inconsistent with statements in Chapter Five, and we assume that a typographical error has been made. We believe the word "not" in the above sentence should be deleted.

We take issue with the contention on page 6-2 (second full paragraph) that "protective or mitigative measures ... will provide assurance that Federal coal development decisions which are made will be subject to less delay and uncertainty." The review process for potential leases and mine plan applications contains a number of opportunities for public participation -- opportunities which occur later in the process. Many of the potential problems may not come to light until then, and there is no guarantee that early consideration of possible mitigation will reduce the timespan of the process.

While we understand the interest in reviewing and

reassessing regional production goals on a continual basis (page 6-3, second paragraph), such continual reassessment is rendered almost meaningless because of the lengthy response time in the proposed system (up to 15 years). As in Chapter Three, the implication is left that the regional production goals will be reassessed solely on the basis of the prospective number of suitable tracts available, not on the basis of the need for leasing. "The leasing of an excess number of tracts" is not necessarily harmful, since due diligence requirements necessitate an early indication of the development prospects of each lease. Leases not able to meet the diligence requirements are relinquished with no harm to the environment. This point should be expressed, or at least the statement about "excess" leasing should be clarified in the final statement.

The statement is made that "site-specific analysis of each tract would be conducted prior to ranking and an examination would be made for each selected tract to develop lease stipulations if necessary" (emphasis added) (page 6-3, column two, second paragraph). Given the level of protection afforded by SMCRA in setting mine permit requirements, and the fact that many of the "ranked" tracts may not be finally offered for lease, detailed analysis, prior to ranking, may be a waste of federal resources. At that stage, much of the work will be of no consequence and will unnecessarily contribute to a monumental workload problem for the agencies involved.

6.3.2 - Socioeconomic Impact Mitigation

The statement fails to adequately point out the full range of assistance available to impacted communities. Of particular consequence are the changes in the formula for distributing federal royalty payments; increases in state severance taxes, impact aid under the Federal Land Policy and Management Act (FLPMA), and payments in-lieu-of-taxes. Several, but not all, of the above programs are mentioned (6.3.2.8), but there is no quantification of the assistance available, or potentially available, to communities impacted by federal coal development. We believe the data will show a significant amount of financial aid is readily available which could reduce the socioeconomic impacts involved. In any case, further information should be provided.

CHAPTER SEVEN: LONG-TERM ENVIRONMENTAL CONSEQUENCES OF FEDERAL COAL MANAGEMENT PROGRAM ALTERNATIVES

It appears that the description of the long-term effects of the preferred program and its alternatives tends to disregard the mitigative effects of recent environmental protection statutes. For example, the possible disruptions to the hydrologic balance mentioned in the statement (page 7-2, first column, third paragraph) would not appear to be reasonable in view of the provisions of SMCRA which prohibit disruption of the hydrologic balance.

Adverse water quality impacts (page 7-2, second column, second paragraph) will be greatly mitigated by waste treatment

and erosion control requirements under the Clean Water Act and SMCRA. The statement seems to belie the effects of these statutes.

Basic coal mining operations do not require large quantities of water, as is implied on page 7-2 (second column, first paragraph). Some water is used in coal processing facilities, but the only water used at some mines is for dust suppression and sanitary needs. Frequently, pit water provides most of the water requirements for a mining operation.

7.1.1.4 - Paleontological Resources

Criteria and guidelines for the protection and recovery of paleontological resources have not been released; therefore, the public is unable to evaluate those resources and potential impacts.

7.1.2 - Ecological Resources

The statement is made that "Loss of habitat and reductions in population would occur as unavoidable consequences during the mining and use of coal." Wildlife studies conducted the past five years at Peabody's Big Sky Mine have not shown a reduction in population due to the mining activity. The size of population appears to be more dependent on climatic changes and its effect on vegetation. In addition, additional acreage of certain habitat types beneficial to wildlife (i.e., reclamation areas and water impoundments) may be established.

The statement also says that "blasting, construction, and other noises associated with the mining activity would

be unavoidable and would frighten away some wildlife species." Wildlife species are adaptable to noise, as is man. Although animals may initially scatter at the time of a blast, studies have shown that a creature will generally remain within its territorial range.

Elimination of surface water bodies would adversely affect waterfowl, but changes made by the mining activity can also be beneficial to waterfowl. Big Sky Mine has increased the waterfowl population in the area with the creation of shallow reclamation ponds. In essence, temporary disruption may occur, but long-term benefits could ensue. The statement should reflect this possibility.

The statement remarks that "In most cases, however, the diversity, density, and composition of the new populations would be altered from previous conditions." Diversity, density, and composition are dynamic aspects of wildlife populations, and therefore constantly changing. Just because one of these aspects, or all three, may be altered to some degree does not necessarily mean that the impact is adverse.

Table 7-3 should include references. For example, we cannot determine whether the table represents potential productivity on an annual basis or in total. Some of the estimates for reclaimed land in Table 7-3 are as much as ten times greater than current empirical data would show for unmined land. For example:

	Forest	Range
Powder River (reclaimed) (as represented in Table 7-3)	0.46 tons/acre	5.9 tons/acre
Big Sky (reference area) (Peabody Coal Co.)	0.25 tons/acre	0.5 tons/acre

The variation may occur because the Big Sky data shows productivity on an annual basis.

7.3.4 - Wildlife

In this section, revegetation of range in Texas is stated as taking three years, where in Section 7.3.3 the same revegetation in Texas is stated as taking one year.

-- Table 7-5. When comparing this table with Appendix D-1, certain incongruities occur:

Powder River	1 game mammal/13 acres (7-5) 1 game mammal/33 to 200 acres (D-1)
Green River	1 game mammal/13 acres (7-5) 1 game mammal/66-250 acres (D-1)
Fort Union	1 predator/500 acres (7-5) 1 predator/3,200 acres (D-1)
Denver-Raton Mesa	1 game bird/5 acres (7-5) 1 game bird/1 acre (D-1)
Denver-Raton Mesa	13.7 acres/animal unit (7-5) 1.6 acres/animal unit (D-1)

In reviewing the two sets of data, Table 7-5 and Appendix D-1 seem to imply that reclaimed land in the Powder River, Green River, and Fort Union Regions will support three (3) to nineteen (19) times the relative wildlife population said to exist naturally, while the Denver-Raton Mesa will support a wildlife population five (5) to nine (9) times less than exist naturally. Explanation of this extreme variance is needed.



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February 9, 1979

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Office of Coal Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

The Environmental Information Center submits the enclosed comments in response to the Draft Environmental Statement, Federal Coal Management Program, published December 1978. Our organization maintains a large statewide membership of Montana citizens concerned with the future of Montana and its environment. These comments were prepared by a group of Montanans who are members of the Environmental Information Center (EIC), and who have considerable experience in public energy policy, natural resource management, environmental impact assessment and regulation of all phases of mining in Montana. Our comments range from broad philosophical and policy-oriented issues to specific evaluations of discrete points. Charles van Hook, Public Service Science Resident, coordinated preparation of comments.

Please accept these comments as our sincere effort to represent the feelings of many Montanans to the Secretary of the Interior. We also are sincere in our efforts to further open the door for public participation in preparation of and comment on Federal and State energy policies, now and in the future.

We look forward to working with the Federal coal management agencies in the future.

Sincerely,

Bob Kiesling

Bob Kiesling
Staff Director

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Enclosure

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Programmatic comments

This attempt by the Federal government to propose a management plan for U.S. controlled coal is similar to previous plans although improved in a number of aspects. The impression one receives in reading the DES is that the goal is to propose a leasing plan rather than discuss impacts or alternatives.

Montana citizens have, for the last decade, expressed much concern for the State's agricultural/environmental future relative to coal extraction and conversion. Public opinion polls have demonstrated a reluctance to accept large scale development, and approval of any development has been always been predicated upon strict environmental protection, an assumption of successful, quality reclamation, and more recently, a belief that the nation's highest state severance tax would serve to mitigate social problems. To date, the reclamation "experiment" in Montana has given inconclusive results and the severance tax is in its infancy.

One essential tool of resource management that is not operational in Montana is planning. Montana citizens, particularly in the rural, agricultural Powder River Basin area, have never been confronted with the rapid changes in land use, economics, and politics that require planning. As a result, local governments have little, if any, planning authority and are unfamiliar with its use. The state as a whole has never developed a viable energy policy and does not have a planning structure capable of recognizing or remedying mining induced impacts of an economic or social nature. Should it become necessary to establish a new town in remote mining areas, it must be recognized that there is neither the authority nor the experience available to guarantee orderly accomplishment of such a task. In summary, the lack of viable planning experience necessary to deal with large scale mining activities results in a lack of capability. The time, money, and experience necessary to remedy this situation has not yet been available. This circumstance in Montana supports the findings of the Energy Impact Assistance Steering Group presented in Section 6.3.1, and also in the National Coal Policy Project report not considered in your document.

The Montana experience, thus far, in dealing with the natural/biological impacts from current and proposed mining activities may be impressive but it is far short of comprehensive problem solving. An array of brief and inconclusive research activities has been conducted at great expense. Much impact analyses/research has been carried out at the direction of or with funding from energy corporations and pro-mining agencies at the State and Federal level. Some objective, scientific inquiries have been supported by agencies such as EPA, but results are as yet inconclusive. State agency efforts to conduct meaningful research are piecemeal, poorly funded, or generally lacking in political support. There is as yet a tremendous array of unresolved but critical biological -natural resource issues surrounding coal mining in Montana. The Montana mine reclamation law and the new Federal reclamation law, in particular, present an endless series of scientific suppositions concerning reclamation in the semiarid west. To date, the extent and severity of impacts upon the soils, vegetation, air, water, and wildlife have not been clearly

determined and may never be within our lifetime. The supposition of mitigation is an awkward exercise in logic under these conditions.

The issue at hand, which necessitates these observations of coal impact problems, is the federal government's apparent intent to further stimulate mining in Montana. This intent seems based upon increased national need for coal, which may be valid, but which becomes more nebulous with each federal/industrial effort to quantify such need. Only after the question of need, and regional disaggregation of need is resolved should specific production areas be identified.

The rapid expansion of new mining activities in Montana will precipitate public resistance in many forms. It is essential for the public welfare and the Montana environment that any move to significantly increase coal production be made with the utmost care. It is also necessary that the current array of unfounded mitigation assumptions be discarded or accurately recognized in the federal planning process. A demand for honesty in impact assessment will dictate recognition of the following:

- Successful reclamation of land and water is uncertain
- Funds for impact mitigation are uncertain, and the best use of those funds is unclear
- Community and state level planning is currently inoperative and may remain inoperative
- Accurate and timely identification of critical impacts is limited and may never be proficient
- Local human communities and natural ecosystems will be permanently changed, and the direction of that change is unpredictable and uncontrollable
- Continued expansion of large corporate energy activities in rural Montana will accelerate the shift in local political structure away from public/agricultural/environmental concerns and toward greater protection of corporate interests

It is necessary that both biological and social impacts be minimized in the process of siting new mining activities in Montana. The current experimental nature of mitigation of mining impacts in the undisturbed rural areas of the West indicates that concentration of mining activities and their effects is the only feasible strategy for reducing uncontrollable, areawide disruption. The draft Federal Coal Management E.S. (DES) briefly discusses this option in Section 5.4.4. This strategy for Western coal mine siting is also covered in more detail in a paper presented to the Conference on Energy and the Public Lands, III, at the University of Utah, August 18, 1978[1], which should be studied by the Dept. of Interior.

In Section 5.4.4, "Concentrating Federal Leases," several problems are pointed out regarding this strategy, in particular, the concentration of air and water pollution. It would be beneficial to concentrate these

[1]Federal Coal Leasing Policy Guidelines: "Where", "When", and How? Curry, Robert R. and Charles van Hook. Conference on Energy and the Public Lands, III. Univ. of Utah, Park City, Utah. Aug. 18, 1978.

impacts so that a more economical and effective program of monitoring and abatement could be utilized. The construction of one or only a few high quality water treatment facilities, for use by several companies, would be less expensive and more effective in protecting water quality. Similarly, the joint use of dust abatement equipment and materials would be more cost effective and give better results. The current situation in Montana involves serious violations of TSP regulations at every mining site where monitoring networks are sufficient to adequately measure air quality. The Montana air quality regulatory process is currently inadequate (with financial support from the federal government) and will be spread more thinly and be even less effective with further dispersal of mining activities. Concentration of air pollution sources is the only way the regulatory agencies will catch up with the problems of monitoring and equitable enforcement, given the existing monetary constraints.

One inherent benefit in concentrating development is that failure of water and air pollution control efforts will confine damage to fewer air and watersheds.

Another problem which the DES implies (in Section 5.2.4) would be related to concentration of Federal Leasing is hyperurbanization. It is unlikely that expanded coal mining could occur in the Northern Powder River Basin area of Montana without the occurrence of hyperurbanization, regardless of what type of management plan is utilized. The coal industry is planning a town near Decker, Montana, which may accommodate a large number of company employees. The State and counties are not presently (and may never be) in a position to develop and implement such a plan. The occurrence of hyperurbanization in this area is guaranteed and it is fortunate that someone is trying to accommodate it in a controlled manner. However, the proposed new town may not necessarily confine the impacts of new population to the immediate area. Furthermore, it is not guaranteed whether future federal leasing strategy will make this town an efficient service center or result in several other less cost effective, less efficiently planned settlements. It is essential that the leasing strategy encourage the use of both Colstrip and the new town, at Decker, and that it make every possible effort to discourage the opening of mines in areas not local to these centers. It is also necessary that both the leasing strategy and any allocation of funds be used in a manner to prohibit the construction of new highways and railroads through this rural agricultural area. It must be recognized that new highways and railroads rapidly consume as much or more land than strip mines. These concepts require coordination of multiagency federal actions in a manner which will allow both promotion of desirable activities and restriction of undesirable activities. If such planning and support strategies are not comprehensive, the Federal role in coal management will, in itself, overwhelmingly impact Montana.

It is apparent that some companies are planning to open mining operations on non-Federal coal with the intention of later forcing a Federal lease sale on adjacent Federal coal. Such activities will preclude many benefits of a thoughtfully designed lease strategy, whether or not the Federal coal is ultimately obtained. Federal coal management must provide a method for restricting such operations in order to protect the welfare of the general public as well as the land, air, and water.

If the Federal coal management program cannot control all coal mining in Montana, then it will be rendered largely ineffective, perhaps to the point where its existence will be nonessential and unproductive for the nation as well as for Montana.

It is recognized that planning concentrated leasing and mining will not answer the shortcomings in reclamation experience, impact mitigation funds and their wise use, identification of impacts, permanence of induced changes, and local political changes (all discussed earlier). With these issues in mind, there is a strong possibility that any area of mining activity may be perceived as a national sacrifice area to some degree and in some manner. Dispersing impacts throughout the region will dilute their perceived severity; however, in the long run the whole region will be damaged in a manner which will be more difficult for the State to deal with.

The recognition of concentrated or cluster development as a front-end strategy for managing negative impacts can also offer insight into the extra cost and effort necessary to deal with dispersed impacts. The following summary lists some advantages of concentrated or clustered mining in an area such as Eastern Montana.

1. A mining cluster will support a new town which is designed solely for the purpose of supporting mining activities.

   a. The town can provide quality health care, social services, retail merchandise, cultural and recreational opportunities, and fire and police protection specifically oriented to a mining community.

   b. Local utilities such as water supply, sewage treatment, street maintenance, transportation, and communications can be arranged more efficiently and cheaply, with less impact.

   c. Local zoning, land use planning, government, educational facilities, and taxation can be designed for the unique population and its needs.

   d. The social and political activities in this town can serve the needs and reflect the interests of a mining oriented population without causing conflict with and disruption of other populations with different interests and needs.

   e. The new town can be serviced with one highway, one railway, one airport, one communications line, and one power line thereby greatly reducing the costs and use of land in duplicating these facilities.

2. With the establishment of a mining cluster and one new town the extent of impact on natural/biological systems can be reduced.

   a. The monitoring, source identification, and abatement of air pollution can be done more economically with more sophisticated equipment and with permanent trained personnel. Enforcement is

more equitable and air quality problems will be confined if enforcement is not effective.

   b. The monitoring, source identification, and abatement of surface water pollution can be accomplished with one or a few treatment/monitoring facilities operated by permanent, trained personnel. The water quality problems will be confined to one drainage net if enforcement activities are not effective.

   c. The mining cluster area, because of its confinement can be served effectively by special wildlife management efforts necessary to preserve, relocate, or reestablish wildlife species and their unique habitats.

   d. Ground water may be monitored more efficiently in a mining cluster, at less cost to each individual company, and area aquifer disruption will be more easily defined for purposes of reclamation planning. Should reclamation be unsuccessful or not be enforced, the area of groundwater affected will be confined.

3. The establishment of a mining cluster and new town will provide economy, efficiency, and maximum recovery to mining activities.

   a. A cluster would be located in an area of thick coal seams containing high quality coal, thereby minimizing the need to disturb large surface areas to extract the resource and reducing the cost of reclamation per ton of coal.

   b. Companies could share common facilities such as coal loadouts, offices, road maintenance equipment, transportation lines, power supplies, and ambulance and fire protection, all of which would reduce the overhead costs and initial capitol outlay for each mining operation, thereby reducing the cost of coal.

   c. All land in the mining cluster would be available for mining and associated disturbance (town), thereby preventing problems with encroachment upon and conflict with agricultural operations. Such a land use designation would provide an opportunity for removal of all coal by surface mining, and for joint mining ventures to continue underground to deeper seams to under higher terrain as technology of mining changed to allow maximum recovery.

   d. Cooperative efforts between adjacent mining operations could greatly increase the quality of reclamation and reduce its costs by: establishing a seed production area; coordinating reclamation planning to facilitate area drainage and abatement of wind erosion; coordinating the reestablishment of unique, and essential habitats; and sharing costs in the management of sediment and air pollution leaving the reclamation areas.

   e. Specialized equipment and skilled technicians could be shared in a mining cluster thereby allowing more efficient removal of coal,

better reclamation work, and more specialized community and industrial services than would be available to or could be afforded by an individual company.

A great deal of Montana's better coal deposits are leased via the Federal government, State Lands and private coal owners. The leasing pattern around Decker, Montana, is intensive, due to the high quality, thick coal seams in the area. A cluster development strategy would work well here and would probably occur regardless of Federal and State policies. Although it is unclear which companies or individuals are sitting on leases, details are unimportant. What is important is that this potential cluster development is a very advantageous mining area. It is our intention to use the Decker area as an example for the following:

1. Planning (industrial) in the area has located a potential town site and has recognized a need for a new town designed to serve mining needs.

2. The area has access via highway and railroad.

3. The resource inventory efforts in this area exceed all other areas in Montana at this time, and far surpass the amount of resource data Management Framework Plans currently available.

4. The time and money required for the BLM to match this level of information will be great and the results will be far less adequate.

5. The area has made the initial adjustments to mining activities, and future expansion, confined to this area and managed properly, will cause a relatively lesser impact.

6. There have been several site-specific impact studies and more are now being done relative to both current and proposed coal mining activities in this area.

7. The Spring Creek Mine proposal, current and proposed Decker Mines, current Public Service Company of Oklahoma Mine, and the proposed Shell Mine constitute a viable cluster capable of producing more than enough coal to meet Montana's quota, whatever that is, without spreading impacts throughout the state.

8. Our suggestion for using this area as a confined mining cluster is predicated entirely upon the questionable assumption that expanded Montana production is necessary. Furthermore, our suggestions are also based upon the assumption that the Federal and State governments will jointly attempt a productive planning exercise which will provide coal while restricting the location of mining activities to this area, excluding only currently operating mines. We understand that excluding new mining in other areas is the most difficult part of the task, but we expect policy makers to use creative efforts in order to activate a leasing policy which will serve the best interests of the Montana public and environment.

One of the greatest hardships coal mining has imposed upon the Montana public and state agencies in the industrial mine planning process. Every rancher and county official dreads the announcement of a new mine in an area where a mine was previously unexpected. Also, one of the most devastating social impacts built into the "proposed alternative" is the reconsideration of leasing decisions at four year intervals. This provision is guaranteed to serve as a public harassment cycle in a rural, coal bearing area such as Eastern Montana. Furthermore, the poorly constructed resource inventory studies carried out by the BLM and the constant rewriting of impact statements is an embarrassing waste of the government's and the public's time and money.

It is our belief that quality impact assessment is a necessary social and environmental policy. It is our belief that planning a viable mining cluster, with a new town, could provide at least 40 years of production without an endless array of politically influenced piecemeal efforts to justify a single mine for a period of a few years. The proposed four year lease planning cycle is a piecemeal, fragmented, insidious method of promoting social unrest in Eastern Montana. In short, we want to see the big plan, and we want to see the justification for this plan in terms of national coal use/need strategy. It is also our opinion that the Western state governments will not feel confident in developing viable energy production strategies and policies until a clear long range Federal program is established.

It is also necessary to point out that the "preferred alternative" indicates frequent communications with the governors of states as a means of determining a state's position relative to a proposed development question. We wish to point out that much more than the Governor's response is necessary to determine the opinions and needs of the people of Montana. We suggest that the Secretary of the Interior solicit public opinion on how to gather public opinion in Western states. This elusive phenomena called public opinion has been very difficult to determine by holding public hearings, and is not to be obtained through the Governor.

We ask that public representation be provided in Federal land use planning efforts, activity planning, setting regional production goals, and tract ranking and selection. Closed meetings between repesentatives of the Governor and BLM has always guaranteed industrial oriented development proposals in Montana. For the State and Federal governments to regain public credibility in Montana it is necessary to involve representatives of public interest groups, as well as other concerned citizens from a wide range of special interests in the State.

Engaging citizen representatives directly in the planning process allows for better public representation than do public hearings attended by people who are only marginally aware of the planning relationships between industry and government. Our elected officials represent not the public, but, rather, the best fortified and funded pressure groups. Since government is supposed to be an arm of the people, public representatives should participate in the step-by-step decision making operations. Only by incorporating ample positions for such representation into your normally closed sessions can you hope to alleviate the social tension and mistrust currently present. Representatives in Montana should be

appointed by public interest groups (based upon membership size, relative to citizen representation), in behalf of environmental and conservation concerns. The EIC wants to participate in these governmental issues, and asks for support in this effort as it affects the State of Montana.

Comments on specific points in the DES follow, and are organized by chapters.

CHAPTER I

Page 1-2 states that part of the purpose of the DES is to "fully analyze the alternatives to the proposed program." It is debatable whether this admirable goal has been fulfilled.

In Figure 1-2, the areas where states share responsibility and authority for preparing regional EIS's should be mentioned. This minor oversight makes one wonder whether later references to state involvement are sincere.

Table 1-1 (page 1-6) lists only one site-specific mining and reclamation plan. Two DEIS's already have been issued (Nerco and Peabody) for the Powder River Regional EIS.

A chapter on Federal-State relationships in Federal coal management would be appropriate in this generally well written and informative chapter.

CHAPTER 2

Why are the northern Montana coal areas omitted from consideration (p. 2-1)? The Milk River coal field and the Belt area certainly have potential for development and recent interest has accelerated. Production from these areas of mostly private coal could significantly affect regional production goals. Other areas of Montana also contain significant private reserves that should be included (Bull Mountains, Red Lodge, Livingston, etc.). When all coal resources in Montana outside the Fort Union and Powder River Basin are considered, a more realistic appraisal may be possible. While omission of these reserves may be insignificant on a national scale, these areas may eventually be very significant on a statewide or regional scale.

The DES does not explain how the regional coal production targets will be derived from the projections supplied by DOE. Smilarly, there is insufficient information provided to permit a critical evaluation of the model and process used to derive DOE production targets. A separate document, DOE's June 1978 coal production forecast, is required to make even a cursory assessment. This publication assigns a high 1990 Montana coal production target of 340 mtpy. The coal origin/destination tables indicate that in 1990 a significant portion of the Powder River coal would be shipped to areas that have never received Montana coal. Considering the effect of "best available control technology" and of Federal and State statutes to require utilities to use the most cost effective

fuels, it seems highly unlikely that economic conditions will shift, such that Montana coal will be sent to the East Coast. The methodology used to derive coal production projections may contain numerous erroneous assumptions, and model results may not reflect actual conditions. The targets must be subjected to public and State level input and modifications, especially if more specific information is available, as is the case in Montana. The DES appears to specifically exclude State input into this part of the process. This is a serious omission since the regional coal production targets will drive the entire coal management program.

In Table 2-19, why are recoverable reserves of existing federal leases for Montana confidential? This makes a thorough analysis very difficult. This comment holds true for other tables in the DES with data withheld.

It seems somewhat incongruous to hide the section discussing the need for new leasing (Section 2.8) in the back of a chapter dealing with history and numbers. This section essentially forms the justification for coal leasing and deserves more prominence than given. This is a very interesting section in that adjectives and phrases stating the vulnerability and problems associated with making an accurate assessment of need are generally lacking.

The last paragraph of Section 2.8.1 (page 2-47) may be included as a desirable impact of leasing less federal coal than is NEEDED to meet national energy objectives, especially as it relates to areas of extensive federal coal ownership.

In Section 2.8.2, the role of non-Federal coal is stated as not having much potential in the Fort Union and Powder River areas of Montana. This may be true but most non-Federal coal reserves in Montana have been eliminated from consideration in the DES because they occur outside the regions covered. Potential production from non-Federal reserves could be important in Montana without additional federal leasing.

CHAPTER 3

Chapter 3 discusses alternatives briefly and the proposed program in detail. Several problems are inherent in the preferred alternative:

1) The federal land use planning process is indefinite at this time, since proposed BLM planning rules are in a draft stage. The planning process is a very important step in Federal coal leasing. It is therefore imperative that well defined and formally adopted regulations be provided and discussed in the DES. It is irresponsible to state that "the land management agencies' planning efforts... are to provide the initiative and forums for making of the principal decisions in the Federal coal management program" when the mechanics of these planning efforts are in limbo.

All areas to be considered for possible coal leasing should be subject to the new planning process rather than based on results of the

old process. The DES states that proposed differences in the planning process (BLM) are designed to substantially improve the quality of land use plans. This implies that existing plans are not nearly as good as new plans could be. A land resource decision as significant as coal leasing should not be based on the lower quality existing land use plans. Decisions should be postponed until new plans are available.

2) The lands unsuitability criteria are a joke since exceptions are listed for virtually every criterian. It is not in the interest of sound land use planning to make exceptions for everything. Definite plans for evaluating unsuitable lands should be included in the planning process. It is stated that " a responsible official would make his recommendations on the best available data that can be obtained given the time and resources available to prepare the land use plan". This is utterly ridiculous. The land use planning process should be designed to include methodologies to provide for a sound evaluation of unsuitable lands in a timely manner. Too many federal decisions in the past have been based on "best available data...given the time" with less than desirable results.

Of the many questions raised during review of this DES, the emergency leasing system (page 3-27) is of particular concern. It is very poorly defined. How and when is it determined that emergency leasing conditions exist? How will the method of tract identification differ from normal and how would the scope and breadth of planning and environmental assessment differ from normal? When the applicant (company) shows coal is needed to sustain or increase production levels, will production be correlated to the need for coal?...or to the need for profit? In view of the limited information provided on emergency leasing, it would appear that this is a "quick and dirty" technique, so to speak, for companies to either get around the normal leasing process, or to avoid proper planning, or to make up for lack of foresight.

CHAPTER 5

1. Define the jargon "environmental residuals" (p. 5-1).

2. How is your coal cycle cyclic (p. 5-1)? Will money be generated from this "cycle" to support alternative, especially solar, energy developments?

3. The Department of Energy's coal demand projections should be revised to take into account: 1) the current slump in the coal market; 2) the glut of Alaskan oil which may be crossing Montana via the Northern Tier Pipeline; and 3) the potential influx of Mexican natural gas.

4. What other goals for reclamation are implied by the statement that "the major thrust would be to return disturbed land to the contour and use specified..."?

5. The assumption that "development of other resources in the Federal coal regions will not significantly interfere with coal development under the Federal coal management program" implies that coal is

the most important resource in the regions. This certainly negates the lands unsuitability program and could be interpreted such that agriculture, grazing, wildlife, water, etc. are secondary to coal development. How does the Multiple Use Act relate to this implied policy. The assumption should be that "development of other resources could and should alter the coal management program."

6. How would shortages in the transportation network affect your assumption that development of other resources would not interfere with coal development. How have transportation costs been built into your assumptions on where to develop.

7. What is the meaning of the last sentence in the last assumption concerning compensating regional production adjustments?

8. Have reclamation costs been used to determine leasing policy?

9. Basing reclamation potential on Packer's work is very risky, particularly in view of the time required for soil and plant community development in a semiarid region such as the Powder River Basin (p. 5-17).

10. Page 5-23 (6th paragraph) How is it possible to determine whether initially irrigated plant communities on reclaimed areas could maintain native area densities for indefinite period of time? Sounds like research Hodder might be interested in.

11. What are the potential air quality impacts?

12. Impacts of particulates are inadequately defined and addressed. The only impact defined is the reduction in visibility, but no context is given. How large is the surrounding area (p. 5-51)?

13. If the estimates of 0.2 to 2 percent coal dust loss from unit trains on p. 5-53 are based on the Weigert and Jensen report they should be researched again as these estimates are not based on research. More than one source of information should be used. These emissions do not accurately reflect emissions from dry western coals. The relationship between power plant emissions and coal leasing policy, if there is one, is unclear. Additionally, the impacts of gaseous emissions are not defined anywhere, nor are gaseous emissions from mines or power plants related to air quality standards. Probability of violation of standards should be addressed as well. Finally, there is no discussion of impacts from nitrogen oxide fumigations due to overburden and coal blasting.

14. Trace elements have impacts other than those associated with health (e.g. to livestock, crops, wildlife and vegetation) which should be discussed. How do trace element impacts, on coal dust, power plant emissions, and overburden vary from region to region and thus, how do they relate to the leasing policy?

15. Why are emission control standards for power plants addressed, and emission control for coal mines and coal transport not addressed?

Certainly the latter would be of greater importance in defining a leasing policy. If not, why not?

16. The analysis of nonattainment areas is irrelevant. Where are the nonattainment areas, and how do they relate to coal mining and to coal leasing policies? Will emissions controls at coal mines be sufficient within the various regions to prevent allowable PSD increments from being violated?

17. In conclusion, it would seem that information has been presented here in a random fashion without definition of impacts, or their magnitude and significance. Are we to conclude mining, particularly strip mining, has no impact on air quality? The data are obviously available; consequently, this section must be rewritten, and the original authors sent back to their respective divisions, and replaced by qualified, competent professionals.

18. Is the loss of potential productivity here based on acreage disturbed, on reclamation potential, or on postreclamation productivity projections? The impacts vary significantly depending on the definition (p. 5-73). Productivity losses are based on misleading data. It should be pointed out that belowground and aboveground productivity is listed in the tables.

19. What, in either the Powder River or Fort Union coal regions, could be defined as a nonsensitive ecosystem? In light of the climatic conditions, and the disastrous results of dryland farming in the 1930's (and the subsequent dustbowl conditions), it is insane to call any of this area "nonsensitive" (p. 5-75).

20. In your discussion of impacts to endangered species of the Powder River coal region: where do grizzlies and wolves occur? Neither animal is mentioned in chapter 4. Is all the information presented herein as accurate as this (p. 5-81)?

CHAPTER 6

On page 6-3, it is stated that "The Secretary has also indicated that the Department should be responsible for determining, with reasonable certainty, that a specific tract can be developed without severe or permanent harm to the environment..."

This obviously precludes development of coal leases in the Northern Powder River and Fort Union Coal Basins, as well as coal formations in other semiarid and arid areas, until the success of existing reclamation attempts has been thoroughly evaluated.

It is also stated that EMRIA "would provide site-specific reclamation data for use at the several decision points in the preferred program..." From whom would this data be obtained and which points in the decision-making process are being referred to?

CHAPTER 7

It is stated that degradation of local air quality would occur even though best available emission control technologies are employed (p. 7-2). Why is this chapter assuming best available technology for impact evaluation when in chapter 5 best practicle technology is assumed?

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Northern Minerals Company

February 9, 1979

Office of Coal Management
(140) Bureau of Land Management
Department of the Interior
18th and C Streets NW
Washington, D.C. 20240

073

RE: Comments: Federal Coal Management Program

Dear Sirs;

Attached hereto please find comments to the subject draft environmental statement by Northern Minerals Company a subsidary of Northern Natural Gas Company. Please include these as a matter of record to be considered in the preperation in the final statement.

Very truly yours,

Apolonio Baca

AB/cg

Comments to the Draft Environmental
Statement: Federal Coal Management Program

Gentlemen:

Northern Minerals Company, a wholly owned subsidary of Northern Natural Gas Company, Omaha, Nebraska would like to thank the Department of the Interior and the associated agencies for this opportunity to comment on the Draft Environmental Statement of the Federal Coal Management Program. Northern recognizes the vast amount of effort, time and consideration given the program. You are recognized as having addressed most of the issues crucial to leasing of federal coal lands; and the procedures that are "preferred" would seem to allow for future lease sales of federally managed coal now badly needed by the nation during these times of energy deficiencies and rising costs. It is to the procedures and their implementation that we address in our comments.

Comments:

I. Emergency Leasing and Start-Up Programs (DES; 3.2.7 & 3.2.8)

The preferred alternative program provides for federal leasing and lease sales only in those coal regions included in an approved Regional Lease Sale EIS and covered by an approved Resource Management Plan (formerly MFP) EIS (DES: 2.1.17). The Emergency Leasing and Start-Up Program although intended to provide for leasing in those situations where Regional and RMP environmental impact statements are lacking, precludes leasing without the preparation of an environmental impact assessment, 2 years of prior production and continued operation by the applicant, in a by-pass situation, or in order to gain access to other coal deposits, presumably controlled by the applicant. These criteria do not permit for the start up of new mines in area such as eastcentral Montana, northeastern Utah, or the Raton Basin of Colorado and New Mexico prior to a mature program; possible 1982 or 1984; with its lengthy processes and probable legal delays.

Northern, as are many others, has only recently entered into the coal industry and does not hold a major position in any of the eight regions now included in a regional impact statement. Northern's development interests will likely be in areas other than those of recent development. We are concerned about the ability to obtain access to federal lands or split estates in these new areas whereby our development would contribute to the nations coal energy demands and help alleviate through distribution, the socioeconomic impacts now centered in the Powder River Basin and northwest Colorado.

Northern proposes the removal of the by-pass, 2 years of operation and continued operations provisions in the Emergency/Start-Up Program. This would permit new mines to make application and request additional federal lands and still permit the DOI to implement and review the lands applied for according to the suitability and resource trade-off cirteria. Concurrent with emergency leasing for new mines, notably small in production and size, the mature leasing program could be developed and instituted.

II. Split Estate vs. "Federal Lands" (DES, 3.2.4,1 & 3.3.4)

The current procedures (SMCRA, Section 714-d) in the perferred alternative leasing program call for the exclusion of those split estate (ie, federal lands per 3.2.1.1, p. 3-20, paragraph 2) lands where the estate owner has indicated a no mining preference. From the land use evaluation and the tract ranking process (DES; 3.2.22), such an action appears to be a conflicting point of interest on the part of the program and will only result in a incomplete evaluation of the total public estate (lands) and its most beneficial use as either a prime energy resource or other non-mining uses.

To exclude those split estate lands from recommendations on the basis of a single owner or a small groups personal preferences, at that point in time, will lead to wind-fall profits to estate owners and result in higher mining costs and ultimately higher consumer costs and more rapid inflation. Also, those lands excluded by personal non-mineral ownership preferences may be a potentially more valuable or higher ranking resource than other areas found "acceptable" intraregionally or interregionally. If excluded this effectively reduces the meaning and value of the proposed DOE regional production targets and ranking processes.

It is Northern's hope and recommendation that all federal coal lands, regardless of ownership parterns be ranked and the suitablity criteria applied. Lands found acceptable though involving split estates should be included in future lease sales.

The estate owner has a legal right to his preference and a legal avenue by which he can permit mining on his land via sale or lease. The Department of Interior should have no part or influence involving these rights. Northern feels the federal government should refrain itself from a position of determining private estate futures and be concerned only with public lands. The definition of federal lands (DES; 3.2.1.1, p. 3-20, paragraph 2) should be rewritten and exclude any reference to private ownership of any estate.

III. Regional Tract Ranking, Section and Scheduling (DES; 3.2.22)

The proposal to rank federal coal lands acceptable for further leasing consideration for mining would appear to insure the maximum production and most efficiant leasing of "priority" coal lands. Priority would be determined as either low, medium or high in rank. Although now specified in the DES, it implies that all economic factors including transportation, coal quality and market needs would be analyzed along with environmental and multiple use trade-off considerations in the ranking process.

Two serious faults in the DES ranking process exist. First, the process is not clearly outlined. No indication is given as to how the criteria, other than surface owner consent, would be applied and to what degree each would count towards the final decision. Economics should be a key factor. Maximum economic recovery and fair market value of the lands result from considerations of mineabilidy and profitability. Profitability of a tract is determined on the basis of detailed mine planning and market availability. Without significant geologic knowledge of the coal deposits and mine planning the maximum recovery potential of a tract in terms of profit can not be accurately determined.

Second, a tract considered to be low ranking in terms of quality, its thermal value, transportation or economic recovery could quite easily become high ranking due to sudden changes in utility or other industry plant siting capabilites and market needs. Currently, the preferred leasing program would be unable to react to these market changes without significant time losses from re-evaluation of tract rankings and potentially lengthy legal delays in preporation and acceptence of an environmental impact statement. These delays in time would all contribute to increased costs of plant construction and mine development and would mean the difference as far as the attractiveness of the tracts' resources versus other more costly fuel sources.

Northern recommends the system of free enterprise and competition be allowed to determine tract value and ranking. Also, that economic recovery must be based on sound economic principles of evaluation and mine design without imposing probable undue economic constraints upon unleased tracts and mining companies which are ultimately revealed in the form of higher costs of production and use.

IV. Surface Owner Consultation (DES; 3.2.1.3)

The heavy environmental considerations; primarily sociologic, included in the proposed federal leasing program promote and urge the development of underground coal mining versus surface mining because of less apparent environmental impacts. Only "qualified" surface owners will be permitted to state a preference as to the choice of mining method or land use.

The implementation of the "preferred" program will have several serious economic and possibly legal implicaitons.

1) The procedure will be applied to existing nonproduceing leases and PRLA's. It will likly result in the destruction of logical mining units by the withdrawal ("elimination from further consideration for leasing") of federal coal lands from mining. Such objections in favor of the preservation of the habitat of a relatively insignificant species or a personal lifestyle of a few will in turn ultimately result in depriving jobs and income to numerous individuals and their ability to maintain heat and/or power to homes, schools, hospitals and places of employment.

2) "Qualified" surface owners are those individuals who have legal rights through ownership or those obtained via lease agreements, to determine the ultimate use of "private" estates. For the Department to limit those rights via its own criteria and prerogatives infringes upon the law and rights of an individual or group and may be unconsitutional. Such definition of surface owner qualifications will most probably result in legal suits and deter the implementation of an effective program of coal leasing.

3) The proposed program has attempted to stress the expected impact of surface mining in favor of subsurface mining or recovery methods. Adverse impacts from both surface mining and from underground mining and should be weighed before a course of action is set as already appears to have been done (...refrain... leasing...by methods other than (by) underground methods in Section 3.2.1.3, Paragraph 2;

V. In general, Northern anticipates high costs of implementing the "preferred" program both from its direct costs and those associated with staffing; qualified and experietced personel are currently employed in the U.S. Geological Survey and Bureau of Mines. Whether the energy is in the form of coal, or electricity generated by coal fired plants or even synthesized fuel, the programs, as designed, will significantly impact the coal derived energy user in both direct costs of leasing and production and indirect costs in the form of taxes to administer and supervise the program.

Apolonio Baca
Manager, Exploration & Acquisitions
February 9, 1979

CSG EXPLORATION COMPANY

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February 12, 1979

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets, N.W.
Washington, D. C. 20240

074

Gentlemen:

CSG Exploration Company (CSG) is a corporation duly organized under the laws of the State of Delaware and duly authorized to transact the coal, oil, gas and chemical business in all its phases and all activities related thereto within several western states. CSG is a wholly owned subsidiary of Cities Service Gas Company.

CSG is endeavoring to provide additional gas supplies for Cities Service Gas Company to satisfy its long-term customer needs. It is a matter of common knowledge that the long-term natural gas supply picture reflects shortages and Cities Service Gas Company's outlook is similar.

Cities Service Gas Company delivers natural gas to local distributors in 502 communities in Kansas, Missouri, Oklahoma, Nebraska and Texas. Not withstanding its concentrated efforts to attach new supplies of natural gas, Cities Service has been unable to contract for sufficient volumes of new natural gas to augment its currently available gas supply sources to assure long-term gas service to its customers. Current efforts are directed toward the purchase of additional natural gas but even with reasonable success, supplemental gas supplies from projects such as coal gasification will be required by the late 1980's.

To satisfy long-term customer needs utilizing projects which require long lead time, early plans and actions must be taken to provide prospective feedstocks. CSG applauds

tation" August 31, 1978, speaks in terms of a surface owner consent or lease of the surface estate which is underlain by federal coal. It should be obvious that peripheral private lands will be required to mine coal from the mineral estate. This prospect for encirclement could cause a potential bidder to have grave doubts about the value of a consent not including peripheral lands.

Know-It-All/Do-It-All

> The Secretary's preferred coal leasing program places the federal government in a "Know-It-All/Do-It-All" position which is not practical, economical or in the public interest.

During the moratorium on federal coal leasing, state coal interests and coal operators continued to work and plan for the future. The substantial knowledge developed should and would be shared with appropriate federal planning personnel upon request and with conditions. The Bureau of Land Management received much valuable information in response to its call for coal lease nominations on June 1, 1976. A more selected call would obtain a more selected response.

It must be recognized, however, that some of the information developed is confidential. It is in the public interest to incorporate such confidential information in the planning process but the preferred leasing program turns its back on such information contrary to the public interest. Utilization of available knowledge should be an integral part of the leasing program, eliminating the proposed "Know-It-All/Do-It-All" approach.

plans for early federal lease sales which will provide the necessary feedstocks for Cities Service's coal gasification activities.

The Secretary's preferred coal leasing program does not appear workable, however, particularly in relation to surface owner relationships. CSG views natural resource activities as involving two equal estates — surface and mineral. The proposed leasing program will function in the public interest only after this concept is accepted and adopted by the Secretary.

The various option papers prepared for the Secretary clearly recognize that much of the surface estate over federal coal in the Powder River Basin and in the Fort Union region is already in the hands of energy companies, particularly the larger and more mineable reserves. Leasing of these preferred reserves will be required to meet federal goals. In general, the owners of surface or surface consents over preferred federal coal are sophisticated land managers and not uninformed farmers and ranchers as inferred in the working papers. The proposed federal coal leasing program should concentrate on the management of the mineral estate with assurance that the owners of the surface estate will protect their respective property rights.

Additional comments are attached.

Very truly yours,

Bob L. Galloway
Vice President

BLG/kw

Attachment

Comments of CSG Exploration Company
on the Secretary's Preferred Coal Leasing Program

Equal Surface and Mineral Estates

The Secretary's preferred coal leasing program fails to recognize the equality of the surface and mineral estates.

Nothing in the Mineral Leasing Act (MLA) or the Surface Mining Control and Reclamation Act (SMCRA) or any recent judicial determination suggests that the surface estate is inferior to the mineral estate. If all of the position papers prepared for the Secretary had kept this equivalency of estates clearly in focus, the multiplicity of options would disappear.

1. A consent to mine (lease) by either the federal mineral owner or the surface owner must be treated as consents with all the rights attendant thereto under the coal management program in order to preserve the judicial fairness doctrine.

2. Mineral and surface leases have similar provisions and requirements.

a. A mineral lease issued by a railroad or the federal government or a state government maintains continuing control over the mineral estate including but not limited to a bonus payment, definite term of years, royalty payment for the depletion of the estate, minimum production guarantee, prudent operations, lawful operations, protection from wanton acts, labor practices, non-transferral without consent and right of cancellation for failure to perform the above requirements.

b. A surface lease has similar provisions including a bonus, continuing payment, definite term of years, payment for damage, a reclamation requirement, hydrologic protection, lawful operations, approval of assignment, and cancellation for certain failure of performance.

3. The Secretary is prohibited by the MLA from accepting any bid which is less than the fair market value of the coal, as determined by the Secretary. The preferred coal leasing program is developed on the premise that since the Secretary has the authority to lease, he has lesser imputed powers within that authority to lease on only those terms and conditions that he deems appropriate, including compensation and transferability. Since the surface and mineral estates are equal, this line of reasoning would conclude that the surface owner has a corollary right to review the terms of the mineral lease, including compensation. The preferred mining plan does not offer the surface owner any such right of review; therefore, the surface owner will have problems permitting a federal review of his consents for the same "property right" reasons.

Congressional Mandate Ignored

The Secretary's preferred coal leasing program ignores the Congressional mandate of protecting the property rights of surface owners.

The Surface Mining Control and Reclamation Act (SMCRA) Section 714 provides for surface owner protection in the event surface mining techniques are used. Subsection (c) constitutes

a Congressional mandate that "the Secretary shall not enter into any lease of Federal coal deposits until the surface owner has given written consent to enter and commence surface mining operations and the Secretary has obtained evidence of such consent. Valid written consent given by any surface owner prior to August 3, 1977, shall be deemed sufficient for the purposes of complying with this section". This Congressional mandate is clear and unequivocal. Although Congress considered amendments expressly limiting compensation to the surface owner, the bill ultimately enacted included no compensation limitation.

The department's Office of the Solicitor on behalf of the Secretary, attempts to circumvent this clear Congressional mandate by weaving a statutory web from the "fair market value" requirements and the "competitive bidding" provisions of the Mineral Leasing Act (MLA). Through reliance upon such provisions, this advice futiley attempts to justify a right and power to limit the compensation which the surface owner can receive for the granting of his consent. Congress refused to permit the Secretary to limit such compensation. Through reliance upon MLA, the Solicitor attempts to carve out a right for the Secretary to require transferability of any consent in order for it to be considered "valid". Yet, Congress clearly refused to grant such powers to the Secretary.

The underlying reason why Congress rejected these restrictive proposals lies in the fact that surface owners enjoy property rights which Congress was not willing to take for public

use either with or without just compensation. Property rights cannot be dealt with in the cavalier fashion attempted by the preferred coal management program.

Indeed, the surface owner's property rights are, in the eyes of the law, no less than the rights of a sovereign state such as Montana — whose onerous coal severance tax rates will certainly have a far greater impact upon the fair market value of federal coal than could possibly be exerted by any Montana surface owner.

Timid Approach to Coal Leasing

The Secretary's preferred coal leasing program has taken a timid approach to coal leasing when an aggressive approach is in the public interest.

The moratorium on federal coal leasing since 1971 has been a disaster to the coal business and contrary to public interest. Finally, an action is underway to reinitiate coal leasing, but the action is timid and indecisive. The preferred program will further delay coal leasing rather than correct the primary problem, to lease and mine federal coal. Since the government's responsibility for managing federal coal lands in the public interest has been abdicated since 1971, an aggressive coal leasing program is needed to correct some of the problems already created.

Among other things, the preferred program is developed with the expectation that most surface owners will oppose

surface mining of federal coal. This is not true. As a practical matter, surface owner consent will not be a serious problem. The surface owner's primary concern is that their property rights will be properly recognized by the coal miners and the government.

The preferred program would expect surface owners to accept any conceivable successful bidder as the miner on his land without regard for competence, honesty or reliability. Nothing could be further from the truth. The surface owner will not be willing to grant his consent until he has had an opportunity to review and accept the successful bidder (or assignee).

If the surface owner is paid for his land rights and given an opportunity to approve the miner, most surface owners will welcome surface mining and this approach is in the public interest.

"Paper Grading" Exceeds Authority

> The Secretary's preferred coal leasing program proposes to "grade the papers" of all pre-existing surface owner consents, and this "grading" exceeds the Secretary's authority.

The Secretary expects and should receive confirmation of the surface owner's willingness to permit surface mining under preexisting consents. But, the Secretary does not need, nor should he expect, any additional information concerning terms and conditions of such preexisting consents. Assuming federal

lease terms are reasonable, which they should be, surface owner consents and transfers thereof can be acquired on a reasonable basis, consistent with the timing requirements of the leasing process.

The preferred leasing plan should recognize that many surface owner consents will be transferred several times prior to leasing without federal involvement or concern. Subsequent transfers, thanks to the wisdom of Congress, will be made with the same freedom.

Minority Federal Position Ignored

> The Secretary's preferred coal leasing program ignores the possibility that federal coal may occupy a minority (perhaps insignificant) position in some attractive coal mining areas.

In many instances, particularly where federal coal ownership is on a checkerboard pattern, some federal coal will not be economically mineable. In these situations, the ownership of adjoining coal and surface will be of primary importance in establishing the value, if any, of federal coal.

Hopefully, isolated tracts of federal coal can be included in an LMU and be mined in the public interest. With one strong owner holding the adjoining coal and surface, however, the proposed leasing program is not workable.

Not recognized in the papers prepared for the Secretary is the well-documented fact that coal underlies only a portion of any ranch or farm. The paper "Split Estate Leasing Implemen-

montco
P. O. Box 31572 • Billings, Montana 59107 • 406—252-5208 21-F-003

February 9, 1979

Office of Coal Management (140)
Bureau of Land Management
18th & C Streets, N.W.
Washington DC 20240

375

Dear Sirs:

We are pleased to submit the enclosed comments on the Federal Coal Management Program-DES. The comments are focused on our major concern, that of the emergency leasing component. We feel that bypass leasing should be considered separately from the emergency leasing component in the Program.

I hope these comments detail our concerns on this matter.

Sincerely,

MONTCO

Douglas A. Day

Douglas A. Day

DAD:lmd

Enclosures

montco
P. O. Box 31572 • Billings, Montana 59107 • 406—252-5208 21-F-003

TO: Office of Coal Management (140)

FROM: Doug Day, MONTCO

DATE: February 9, 1979

SUBJECT: Comments on the Draft Environmental Statement on the Federal Coal Management Program

These comments are prepared by MONTCO, a surface coal mining venture in Billings, Montana. The comments are not inclusive because of the length and complexity of the Draft Environmental Statement. MONTCO would like to reserve the right to make further comments and to comment on the proposed regulations for the implementation of the Coal Management Program.

MONTCO is specifically concerned with the description of the bypass leasing procedure as made a part of the emergency leasing system.

The emergency leasing system and bypass leasing processes are described in Section 3.1.4 as an alternative of the preferred program. The Section 3.1.4 description is founded on the senseless assumption that the bypass leasing under a new program must follow the rules established in NRDC versus Hughes, with regard to consent agreement. There is no logic to this, and we can only conclude that the author did not intend that this alternative be seriously considered by the Secretary. Our specific objections to this alternative will be evident from the materials which follow.

The emergency leasing system and bypass leasing are also described as a component of the preferred program in Section 3.2.7 and was specifically referred to in the example regulations as Subpart 3425. Section 3.2.7 is a general description of the specific regulations which are found in Subpart 3425 of the example regulations. The following points will be keyed to the example regulations:

- Bypass leasing should not result from "emergency" situations. Bypass leases should result from well-planned mines at which the operator has an economically acceptable option to either mine or pass isolated parcels of Federal coal.

- By including the bypass situation in the emergency leasing system, the realities of the bypass leasing are obscured. For instance, Section 3425.0-2 speaks of the "urgent need for Federal coal" and Section 3425.2(c) imposes the requirements that the coal be "necessary to meet the emergency needs of the applicant". In reality, the applicant may not have a "need" for the coal, but only be bypassing the Federal coal with his mine.

- The true rationale for bypass leasing should be to effectuate national policy, as set forth in the FCLAA of 1976, to provide for orderly leasing and development and to promote maximum economic recovery of Federal coal.

- The losers in the case of bypassed Federal coal are:
  (1) The Federal and State governments of which will lose royalty income;
  (2) The mine operator who will have to absorb part of the cost of a less efficient operation and who can be effected by local legislation such as Montana's Coal Conservation Act;
  (3) The ultimate loser is the consumer, the American public, who will have to bear part of the cost of a less efficient operation and the loss of tax and royalty revenue to its governmental units.

When bypass leasing is taken out of the "emergency" mode and seen as a function of mine geography rather than foolishness or lack of planning by the operator, it is possible to identify several of the regulations now contained in Subpart 3425.2, which create artificial limitations on the Secretary's ability to grant bypass leases.

- Section 3425.2(a)(1)(ii), which requires a showing that some portion of the coal will be used within three years, is not responsive to the length of coal planning cycles. For instance, because of coal quantity and blending requirements, dedication obligations, equipment acquisitions and general mine planning, as may be required by the Montana Reclamation Act, it may be necessary to have mine planning and sequence established five or more

years in advance of mining. Five year and longer planning is impossible if you do not know what Federal coal you own until three years before your are to mine it.

- The requirements of Section 3425.2(a)(2) that the mine operate for two years prior to application has a similarly harmful potential. It is prudent to assume that an application may take two to three years to process--particularly if an EIS must be produced as suggested by Section 3425.5(b). Thus, it could be as long as five years after operation begins before the operator can begin to acquire an isolated Federal tract. There are many situations where it would be economically prudent to start an operation on the isolated Federal tract or to move through the tract at an early date.

- Section 3425.2(a)(3) which requires that the need for coal shall have resulted from circumstances that were beyond the control of the applicant or could not have been reasonably foreseen or planned for. We feel a bypass situation would be foreseen in the planning stages by a careful operator.

- Section 3425.2(c) uses language such as "without violating the integrity of the normal leasing process" is vague and could provide the basis for meaningless and endless dispute. This terminology should be eliminated.

Under the preferred program, there is a distinct possibility that isolated Federal coal, which would be acceptable for leasing, would not be leased as part of the normal leasing process. For instance, such coal may be passed over for initial leasing because of a threshold development situation (Section 3.2.1.4) or because of the regional production targets (Section 3.2.3), which are satisfied, ironically, by mining the very fee or state coal which is causing the bypass.

Thus, it can be seen that the bypass leasing procedure is an important enough element of the preferred program that it should not be relegated to being an off-shoot of the emergency leasing system. Also, it should not be hampered by unnecessary time and production limitations which will limit the Secretary's opportunity to make intelligent and efficient use of the procedure.

DAD:lmd

League of Women Voters of the United Sta 1730 M Street, NW. Washington, D.C. 20036 Tel. (202) 296-1770

PRESIDENT
RUTH J. HINERFELD

OFFICERS
Vice Presidents

Secretary-Treasurer

DIRECTORS

076

February 13, 1979

COMMENTS OF THE LEAGUE OF WOMEN VOTERS OF THE UNITED STATES
ON THE DRAFT ENVIRONMENTAL STATEMENT
FOR THE FEDERAL COAL MANAGEMENT PROGRAM

The League of Women Voters of the United States is pleased to have the opportunity to comment on the proposed Federal Coal Management Program. The League is a volunteer citizens' organization with 131,000 members in all 50 states, the District of Columbia, the Virgin Islands and Puerto Rico.

The League has a long history of involvement in environmental and land use issues. Recently our members undertook a detailed study of energy sources and the government's role in meeting future needs. The product of this study is a comprehensive national energy position that addresses the nation's immediate problem of dependence on imported oil as well as the long-term problem of diminishing resources. The League's concerns involve not only the environmental impacts of development on federal coal lands but also the socioeconomic effects associated with such development. In sum, our comments on this program reflect the intersecting points of several League natural and human resources positions.

The LWVUS believes the outlined preferred alternative for a Coal Management Program is based on sound principles, such as the integration of coal management with land use planning, unsuitability criteria, a defined federal-state relationship and more meaningful public involvement. We recognize the need for a management program establishing a leasing policy that is both environmentally sound and consistent with long- as well as short-term national energy goals.

The League, however, questions whether you have developed more than the skeletal framework for the preferred alternative. Thus, we are concerned that your proposed schedule for issuing final regulations by August will institute a process before all the administrative mechanisms are in place and risk undermining the goals of the program.

More specifically we question whether there is a need to resume leasing at such a rapid pace. Because the decisions will be long-

term (20 to 30 years), would a short-term delay of a year, or even two, significantly affect energy goals? It seems to us that from a national standpoint a well-developed program which can be implemented consistently for a number of years is preferable to one that may fail because of inadequate preparation.

The League is pleased that the intent of the preferred alternative is to integrate coal management with the land use planning provided for by the Federal Land Policy and Management Act (FLPMA). However, we do have some concerns about implementation. Planning regulations required by FLPMA have been proposed only recently, and we understand that it will take 10 years to complete new plans for all BLM lands. We object to the proposed use of existing Management Framework Plans (MFPs) as decision-making documents unless they are reviewed and revised, with adequate opportunities for public participation, to ensure compliance with both FLPMA and the Coal Management Program. As existing MFPs were prepared before FLPMA land use planning goals were instituted, we think it would be inappropriate to use them for leasing decisions without such review. Furthermore, we would like to point out the great variance in the quality of existing MFPs.

We commend the concept of threshold levels called for in the preferred alternative to determine how much coal development can be sustained in a land use planning area. However, there is no proposed mechanism for evaluating the cumulative environmental and socioeconomic impacts on a regional basis of coal development together with other resource development. Also, the staggering of development to mitigate the severity of impacts at a given time on either a regional or sub-regional area has not been examined in the draft EIS. We urge that these two concepts be incorporated into the decision-making procedures.

The LWVUS believes that to ensure full consideration of local, state and national interest in decisions about land resources, mechanisms must be developed for decision making that involve all levels of government, public agencies and the public and private parties affected. While this is the stated goal of the preferred alternative, it is unclear how it will be implemented. The League has found that public involvement in decision making does not "just happen" but must be a carefully planned, specific part of the total process.

We think you should clearly specify how the unsuitability criteria will apply to underground mining. Furthermore, we urge that the unsuitability criteria be applied uniformly with fewer discretionary decisions left to the local agency.

For a number of years the League of Women Voters has worked actively for air and water pollution abatement. Maintenance of existing air and water quality should be a priority in the formulation of the Coal Management Program. In addition, we believe that the use of land must be related to its inherent characteristics and carrying capacities. The preferred program acknowledges this concept.

In conclusion, we urge you not to view the coal management program outlined in the draft EIS as a final product but to refine the program further along the lines we have suggested.

AMAX COAL COMPANY

JOHN M. PAUL
VICE PRESIDENT PUBLIC AFFAIRS

February 12, 1979

Office of Coal Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

077

Gentlemen:

I wish to submit the following comments on the Draft Environmental Impact Statement Federal Coal Management Program on behalf of the AMAX Coal Company.

We are of the opinion that the Draft Environmental Impact Statement complies with the general requirements of the National Environmental Policy Act. This opinion should not be construed as an endorsement of the "Preferred Program" as presented in the Draft Environmental Impact Statement. We share many of the concerns voiced by the American Mining Congress and the National Coal Association in their comments regarding the Preferred Program.

We believe the Example Regulations contained in the Appendix can be improved upon in many areas. In particular, we find part 3461 to be troublesome. In establishing criteria for designating areas unsuitable for mining, the authors have gone far beyond the requirements of the statutory authority relied upon. The primary statutory authority for designating areas unsuitable for mining is Section 522 of the Federal Surface Mining Control and Reclamation Act of 1977. This is also the statutory authority for Subchapter F - areas unsuitable for mining part 760 et seq of the Preferred Alternative final rules contained in Appendix C of the Final Environmental Impact Statement on the Proposed Regulatory Program Implementing Section 501(b) of the Surface Mining Control and Reclamation Act of 1977. One would expect the two proposed regulations to be virtually identical since their statutory authority is identical and they are both being proposed by the Department of Interior. However, a comparison of the two proposed regulations shows the Example Regulations for the leasing program to be much more restrictive than the Preferred Regulations found in the Final Environmental Impact Statement on the Permanent Regulatory Program. Further, an examination of the statutory authority for the two regulations

shows that the Preferred Regulations more closely follow the very detailed and explicit language contained in Section 522 of the Surface Mining Control and Reclamation Act. In our opinion, the regulations should be identical and the language contained in the Preferred Regulations should be adopted in the leasing regulations because the Preferred Regulations more closely follow the statutory language and thus more closely represent congressional intent in this area.

The Example Regulations include criteria which are more appropriately addressed during the permitting process. While it might be advantageous to identify such areas during the unsuitability-determination-process, it is certainly not proper to designate such areas unsuitable because the OSM Regulations designate OSM or the Regulatory Authority as the agency responsible to make such determinations during the permitting process.

It should further be noted that the authors have added some additional criteria for designating areas unsuitable which on the surface appears to have wide ranging applicability and little or no legal or scientific justification. If this Section is adopted as it appears in the Example Regulations, it is difficult to believe that there will be many logical mining units still available for consideration for leasing following the unsuitability determinations.

Another concern we have with the Example Regulations is that they do not adequately address the problem of non-qualifying surface owner's consent. Many coal companies have invested considerable time and effort as well as substantial amounts of capital in acquiring surface rights over federal coal in anticipation of the resumption of the Federal Leasing Program. It would be unconscionable for Interior to promulgate regulations which will completely negate their efforts. We would suggest that the regulations be revised to allow the non-qualifying surface owner the option of either matching the highest bidder's offer or granting surface owner's consent. We agree that Interior should retain the final right to accept or reject any bid including the matching bid. Under these conditions we do not see how matching the highest bidder option would serve to dissuade others from bidding the fair market value.

We also do not believe the problem of establishing a fair market value of a reserve has been well thought out. In a highly regulated industry such as coal mining many of the costs are determined to a large extent by government regulations. This is particularly the case in the west where the government controls 80% of the coal reserves. In other words, the government appears to have virtual control over the market value of coal in the west. Unless some mechanism is developed to subject fair market value determinations to public scrutiny, the determination process will be virtually meaningless.

The concept of "maximum economic recovery" also presents some problems. History will prove that what is economical today may not be economical tomorrow and vice versa. The cold hard facts are that the issue of maximum economic recovery will have to be dealt with at several stages during the mining process. We therefore hesitate to endorse inflexible regulations which do not appear to recognize economic reality. The Example Regulations pertaining to this area must be made flexible if they are to be realistic.

We note that the Example Regulations require Environmental Impact Statements and Environmental Assessments at several stages. We believe some of these can be eliminated and others combined with environmental programs designed to accomplish virtually the same objectives. For example, we do not see the need or objective of preparing an Environmental Impact Statement or conducting an Environmental Assessment during the leasing phase of the program. No environmental harm will occur as a result of holding a lease sale or issuing a coal lease. Adequate safeguards are provided during the exploration and development stages to meet the NEPA requirements by way of environmental permits and approvals. A separate NEPA proceeding during the environmental permit and mine plan approval process is likewise unnecessary and the recently revised NEPA regulations are flexible enough to allow Interior to incorporate the NEPA process in the permitting and mine plan approval process.

We request you keep the record open for two more weeks for the limited purpose of accepting more detailed comments on the Example Regulations from interested parties.

We would also like to suggest that the Department of Interior prepare a Regulatory Analysis of the leasing program in accordance with Executive Order 12044. It would

appear the implementation of the Preferred Program has the potential to place many coal producing regions throughout the nation in a chronic "supply-constrained" condition. Historically, the coal industry has existed in a "demand-constrained" market situation. If the Preferred Program does result in a "supply-constrained" coal market in the western United States, it could, doubtless to say, have major social economic impacts upon those regions of the nation which are dependent on western coals.

Thank you for giving us the opportunity to comment.

Yours very truly,

John H. Paul

JHP/mg

bcc: J. M. Cassady
T. E. Fleury
J. K. Kent
J. H. Simonds
Ray Peck - NCA
Charles Cook - AMC
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UTAH POWER & LIGHT COMPANY

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February 12, 1979

Office of Land Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, DC 20240

Re: United States Department of the Interior Draft Environmental Statement, Federal Coal Management Program

Gentlemen:

Utah Power & Light Company, a Utah corporation, submits the following comments concerning the draft environmental impact statement dated December 19, 1978, for the Federal Coal Management Program.

Utah Power & Light Company is a public utility, providing electrical energy to substantial portions of the State of Utah, as well as southeastern Idaho and southwestern Wyoming. It owns and operates, under contract, several underground coal mines in Emery County, Utah. It holds a number of federal coal leases in connection with said mines, although part of the operations are being conducted on fee lands. It also buys coal from various sources as its needs exceed its ability, at the present, to produce coal. Its service area is one of the fastest growing in the nation. In the past few years, it has constructed several coal-fired generation plants and has several others either under construction or in the planning stage.

In addition to its reserves in Emery County, Utah Power & Light also holds Preference Right Lease Applications on approximately 18,000 acres of federal lands in Garfield and Kane Counties.

Very truly yours,

Ralph L. Jerman

RLJ:p

Enclosure

COMMENTS OF UTAH POWER & LIGHT COMPANY
RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT

Section 2.8.2 of the E.I.S. discusses the question of Leasing to Promote More Desirable Patterns of Coal Development. This section places primary emphasis upon environmental and socio-economic impacts of coal mining, although it does discuss the question of inefficient development patterns resulting from by-passing unleased federal tracts. It does not focus on the question of leasing in areas where the coal, particularly of the proper quality and in an amount to provide adequate reserves, is needed. It is not sufficient to merely determine that the coal to be mined is sufficient in quantity to satisfy the needs of the country. In the near future, at least, the largest users of coal will be electric utilities. Environmental and other considerations require that power plants be built in certain defined areas. In determining what coal is to be leased, and thus in effect promoting more desirable patterns of coal development, this factor should be taken into consideration. The Department cannot merely determine that the nation needs so much coal. It must devote a substantial effort toward determining that coal of the proper quality and proper amounts is available in the areas where it is needed and that there is a method to insure that reserves in an area can be maintained for use over the life of a particular plant. It is clear that the nation's transportation system is not geared to shipping large quantities of coal from mines to distant power plants.

Even if this were possible, the added expansion of such transportation would result in large costs being added to the coal and would have a significant inflationary impact. Moreover, consideration must be given to the fact that considerable energy, most often in the form of scarce oil, would be utilized to operate the railroad or other transportation system. Locating the plants near the coal reserves would thus have a substantial savings effect on other forms of energy.

In Section 2.9 it is pointed out that there is a substantial time lag between the decision to hold a lease sale and the actual coal production. Utah Power concurs wholeheartedly in that position and in the statement that federal leases expected to come into production from 1986 to 1990 should be issued soon. In fact, unless the lease to be issued is in conjunction with an existing operation, the leases would have to be issued now in order for most mines to be in production by that time. Utah Power believes that the most important comment it could make would be one which would stress the urgency of proceeding with coal leasing. The long moratorium which has prevented any significant new leasing has had a significant impact on development of coal reserves in this country and we would seriously urge that a logical and workable leasing program be under way without any further delay.

Section 3.1.1 discusses the preferred program of the

Department. Utah Power believes that of the various alternatives mentioned, the preferred program is, indeed, preferable. We also support the planning system delineated therein under which the procedure for determining acceptable locations for coal production would involve close consultations with government, industry and the public. Another alternative mentioned would be Utah Power's second choice, that of "leasing to meet the coal industry's indication of need." We believe, however, that two of the other alternatives mentioned would be disasterous, that of "no federal coal leasing until 1986" or that of "leasing only by-pass coal and coal needed to maintain existing operations." The adoption of such alternatives could do nothing but worsen an already serious energy shortage. This alternative would force development of coal resources ill suited to the use for which they are to be applied. It would maximize cost and have an adverse environmental impact. It would encourage holding of coal by speculation and be counterproductive of the goals of the coal leasing program.

In Section 3.1.1.1 it is indicated that under the preferred program the Department would rely on the various land management agencies' planning systems to provide the initiative for the making of principal decisions in the Federal Coal Management Program. This is an area where Utah Power strongly believes there should be initial consultation with and input by electric

utilities and other members of the coal industry, and that decisions should not be made by the land management agencies merely on the basis of statistical information. Such a procedure could result in agency decisions which would be hard to change on the basis of later industry consultation.

Utah Power is cognizant of the fact that the statement provides for industry to "submit expressions of interest in possible tracts," but, nonetheless, leaves a preliminary determination up to the land management agencies. We merely hope that their decision would not be cast in concrete by the time the industry expressions are considered. We would also hope that the ranking which is to be done only every four years would not be so inflexible as to preclude changes if the need therefor could be demonstrated by industry or others. Government action can frequently result in a change of planned location for a generating plant, i.e., the proposed Intermountain Power Project. In such case, that may also dictate a need to re-rank the coal supplies and location of coal supply.

Section 3.1.1.2 provides for the establishment of production targets after the country has been divided into twelve production regions. Utah Power, and to our knowledge other utilities, is fearful that setting of regional production targets again would lead to situations where coal of the quality needed for different purposes and in different areas would not

be available when and where needed. It would like to see sufficient flexibility and safeguards built into the system so that this would not happen. This is of special importance to the electrical utilities because before constructing facilities they must have reasonable assurance that a long-term coal supply for each facility will be available, not only nationally, but in the region where the power plants are to be built and operated. The specific location is of critical importance in order that design of the environmental equipment for the plant can be tied to specific coals whose ash content, sulfur content and other properties are known and can be relied upon.

Under Section 3.1.1.3, relating to lease sales, it is noted that the method for conducting sales would vary from sale to sale, but that the responsibility for promulgating regulations concerning the bidding system to be employed belongs to the Department of Energy. It is assumed that the Department would have some input in this connection and we trust that the Department will consider the problems facing the electric power industry in raising capital to obtain the leases. These problems will be discussed under Section 3.2.4.4 below. Any system which requires large sums of front-end money will prevent utilities from acquiring coal and will simply put utility consumers at the mercy of coal speculators.

Section 3.1.1.5 provides that the Department will apply the

same land use planning and unsuitability standards to existing, non-producing leases as are applied to new leases, but that "such application would respect valid existing rights and substantial financial and legal commitments. However, Section 3.1.1.6, relating to Preference Right Lease Applications, indicates that the Department would adopt a policy of applying to such P.R.L.A.s the same environmental planning standards as those applied to new leases. There is not the same indication that the Department will respect valid existing rights and substantial financial and legal commitments. Recent court decisions cited in the E.I.S. demonstrate that the Department does not have discretion to refuse to issue P.R.L.A.s where coal has been found in commercial quantities. These decisions should not be thwarted by overly rigid application of environmental standards, particularly where the applicant has, as is often the case, made a substantial legal financial commitment in connection with them.

Section 3.1.3 discusses another alternative, that of processing outstanding Preference Right Lease Applications. It sets a priority system whereby the processing of P.R.L.A.s would be in the following order: First, those in the least environmental damaging area; second, those in the areas where coal development needs are greatest; and third, those which have been on file for the longest period. This sequence ignores

the rights of those preference right lease applicants for whom processing was accomplished prior to the coal moratorium. Utah Power is in this category and objects to the priority system proposed. If the coal moratorium had not occurred, the coal leases in such cases would have been issued long ago and such holders should not be penalized as a result of situations not within their control. We believe that a system should be established to process all Preference Right Lease Applications and issue leases therefor within a two-year period.

Section 3.2.1, entitled "Land Use Planning," strongly reflects a fault that pervades to some extent the entire E.I.S., that of undue complexity. One receives the impression, after reading that section and reviewing the various charts and figures that after the numerous analyses are applied and the areas affected thereby eliminated, there will be little left for leasing. Thus, we would hope that the process could be simplified and the bases for elimination be reduced. More importantly, the process presently described appears to adopt a negative approach--eliminating unsuitable areas rather than focusing upon those which offer the most potential for coal development. As an electric utility, principally utilizing coal in all of its recently constructed plants, Utah Power is particularly concerned about this problem. More emphasis, we believe, should be placed upon selecting quality lands for coal production than

merely eliminating those areas which various groups or segments could consider unsuitable for coal mining. It is suggested that the principal criteria in the selection of lands for use should be the quantity and quality of the coal contained in the tracts, together with the location of the land in relationship to the places where the coal will be utilized. It should also be recognized that minor differences in coal characteristics can require major design changes in power plant specifications. This observation ties in with several previously made that quantity considerations alone are not sufficient. Adequate consideration must be given to determining where and how the coal is to be used, that there is reasonable transportation and that neither cost of mining nor transporting the coal will be prohibitive or wasteful of petroleum and other natural resources.

Section 3.2.1.1, relating to "unsuitability criteria," is subject to the same observation and criticism. This is especially so when read in conjunction with Table 3.1. Utah Power would have no quarrel with the President's environmental message instructing the Secretary to lease "only those areas where mining is environmentally acceptable and compatable with other land uses." However, it is obvious that different people can review that admonition with drastically different ideas and could administer it with drastically different results.

Section 3.2.5.3 relects an intent on the part of the

Department to involve the industry in all stages of land use planning and target setting process. Utah Power supports this concept and trusts that its implementation will be adequate and utilized to the extent that industry participation is not merely an idle gesture.

Section 3.2.4.3, fair-market value, indicates that no bid shall be accepted for lease which is less than the fair-market value of the coal in the lease. The basic method, it says, of determining fair-market value will be a "discounted cash-flow analysis," which involves calculating annual costs and income resulting from development of property under realistic conditions. Utah Power believes that the bidding system itself will go a long way toward establishing a fair-market value. Theoretical concepts and complicated appraisal procedures, we believe, should not be allowed to slow down and interfere with the bidding process.

Section 3.2.4.4 describes various bidding methods and states that the sale and bidding system should be kept flexible, permitting the choice of method on a case-by-case basis. Utah Power would agree with this concept so long as it takes into consideration the needs of the electric utilities utilizing coal for generation. Six different methods for bidding are discussed. We believe that it is imperative that in situations where the coal is to be utilized by an electric utility, any

bidding system take into account the financial nature of the utility. One of the systems being proposed is direct bonus bidding. That system would be the least acceptable to Utah Power and many other electric utilities. It is well known that the electric utility industry is the most capital intensive of all industries in the country and that all of its income and expenditures are subject to strict regulation by the state and federal governments. As a consequence, these companies would never be in a position to make large cash bonus bids because of the financial difficulties and various problems imposed by such regulations. This should be recognized in the final version of the E.I.S. If the electric utility industry is going to be able to compete with other companies, particularly the large oil and coal companies and other speculators, in bidding on any specific tracts, a royalty system would be desirable.

However, this should not be a royalty system based on profits, but rather should be based on the value of the coal removed from the leased tract. It would have to be considered that the coal will be consumed directly by the public utility, as lessee, and that as the costs incurred in connection with the mining operation, including rents and royalties, are reflected in the rates charged by the utility to its customers. We would be very concerned if the element of "profit" would be considered in the value of the coal which will be consumed directly by the

public utility, as lessee of the coal lands. In this connection, there is no feasible way to determine the element of profit when the coal is utilized by a utility. Emphasis should be placed on payments in connection with production and of requiring high maximum payments if lease is not in production in ten years from the date of lease.

Section 3.3.3, concerning management of existing leases, indicates that in the case of non-producing leases, the Department's preference is to apply the unsuitability criteria to the area of the leasehold at the time the lessee submits a mining plan. Utah Power would strongly object to this procedure in that substantial investments are often required in the preparation of a mining plan and the lessee should have some indication prior to risking such substantial investment that much of the property will not be determined to be unsuitable for mining. It believes, in most cases, that adequate information would be available to the various agencies involved to make a preliminary determination as to unsuitability. We suggest a procedure whereby an application for a preliminary determination could be made and an early response received as to whether there is any reasonable chance that any of the lands involved in the mining plan would subsequently be declared unsuitable for mining. The same section indicates that outstanding P.R.L.A.s would be examined for acceptability for mining, using the same unsuitability

criteria, but this process would not depend upon applicant initiative. This would appear to indicate that there should be some process by which existing leases could be examined, preliminarily at least, without the cost, expense and time in preparing a mining plan from the first instance.

Utah Power is, in fact, extremely concerned about the procedure which may be followed in eliminating the so-called "lands unsuitable for mining." While we recognize that the Department's choices are limited by statutes and other constraints, the opportunities for abuse are so extensive as to be staggering. In reviewing the numerous bases for classifying lands as unsuitable for mining, it becomes obvious that more coal lands in the West could be classified as unsuitable (if the rules were to be stringently followed) than would be available for mining. While this is an area which might better be discussed in another forum, Utah Power strongly urges that great restraints be followed in applying the lands unsuitable for mining criteria. Otherwise a situation could arise not only where extensive tracts would be unavailable for mining, but where those tracts left after elimination would be of a nature that economical mining there would not be possible. Moreover, it is imperative that an adequate system be devised to compensate lessee for the financial losses which would naturally occur to them if lands upon which they have made substantial

legal investments are subsequently declared unsuitable for mining and the lessees are precluded from utilizing them for that purpose.

Section 3.3.6 touches on the question of maximum economic recovery, but does not deal with the problems in an adequate manner. It is obvious that more consideration need to be given to this factor. The statement that "the Secretary prefers that M.E.R. be calculated the way that all coal seams which are collectively profitable must be mined" is too broad and general to be of value.

Section 3.3.7 deals with "end use considerations." This section points out that the Secretary prefers not to adopt end use stipulations as his authority to do so is unclear. Utah Power would agree that in general there should be no end use requirements. However, in determining tract selection, there must be some type of system which assures an adequate supply of coal of the proper type and quality where needed. This would, as noted earlier, require some type of end use consideration, particularly as it relates to the tract selection and bidding process.

In other words, we believe that the Secretary should not dictate the end use that is to be made of any coal, but he should, during various phases of the planning process, take into consideration the intended end use.

Utah Power believes that basically the draft environmental impact statement is a well prepared document. It is obvious that a great deal of work and thought was put into its preparation. As noted above, there are some areas, however, where Utah Power has concern and is therefore submitting the above comments. At this point, it has made no comment on the example regulations contained in the environmental impact statement as there will be an opportunity to do so following the publication of the proposed regulations later this year. For the present, we merely point out that there are some regulations which we feel will require amplification or change and there appear to be various gaps and omissions in the example regulations which probably will be filled at the time the proposed regulations are published.

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Comments of the Ad Hoc Committee on Public Body Leasing

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on the Draft Environmental Statement . Federal Coal Management Program
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February 12, 1979

February 12, 1979

Office of Coal Management
Bureau of Land Management
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ATTENTION: Charles Rech

The following are the comments of the Ad Hoc Public Body Leasing Committee, comprised of representatives from the American Public Power Association (APPA), National Rural Electric Cooperative Association (NRECA), National Rural Utilities Cooperative Finance Corporation (NRUCFC), Western Fuels Association, Inc. (WFA), and Intermountain Power Project (IPP), with regard to the United States Department of Interior Draft Environmental Statement (EIS) on the Federal Coal Management Program published in December, 1978

While we have read and examined the entire EIS, we would like to restrict our comments to the "public body" leasing program which has been outlined in the EIS, pursuant to Section 2 of Public Law 94-377, cited as the Federal Coal Leasing Amendments Act of 1975. It is clear Congress intended to accord a preference to those "public bodies" enumerated therein in the Federal leasing program.

The Secretary of the Interior has indicated his preferred alternative for public body leasing to be "a major program which actively responds to the energy needs of public bodies." We commend the Secretary for this decision and respectfully proffer the following comments which we believe would assist the Secretary in implementing his preferred alternative.

In Section 3.3.8, Public Body Leasing, the statutory term "reasonable number" is used without any defining language. This is also true in Section 3420.1-4(a) of the Example Regulations. In order to truly make public body leasing a major program, we believe the term "reasonable number" should be defined as the number of leases which would meet the long-term coal needs of qualified public bodies, as determined by continuing survey.

We believe the program created by this definition would not cause a massive market displacement in the U. S. coal industry because: (1) the coal requirements of public bodies will constitute a small percentage of total U.S. coal production; (2) a substantial portion of those requirements are likely to be met from nonfederal areas; and (c) some public bodies may find it more attractive to obtain a portion of their coal supply from existing Federal leaseholders.

We urge the Department to undertake a survey of public bodies to determine their existing and future requirements for coal. NRECA and APPA will provide the Department with lists of public bodies useful for this solicitation. In addition, NRECA will supplement the Department's efforts, if desired, with information from studies being performed on coal demand and supply regions for its members. APPA has plans for similar studies, the results from which would be provided to the Department.

Another statutory term which will require clarification is "definite plan." The proviso in the law in which this term appears insures that the coal offered for lease to public bodies would only be used to produce energy for their own use or for sale to their members or customers.

Because of the overall thrust of the proposed coal leasing program of matching actual coal demand with Federal coal leases, we respectfully urge that the term "definite plan" simply require the certification of the governing

entity of the public body that it has made a decision to construct generating facilities which could utilize the coal from Federal leases. It should be remembered that other features of the Coal Leasing Amendments Act cause the relinquishment of any Federal lease which is not developed within a specified period of time.

In addition, we make the following recommendations:

1. It is essential that any coal offered for lease to public bodies at a minimum be comparable in quality, i.e., high Btu, low sulfur, with coal made available for leasing under any general leasing program. Moreover, these coal resources must be economically recoverable, suitable for mining, and within reasonable proximity to transportation facilities.

2. The DOI should permit groups of public bodies to band together in a joint action project which would bid for one coal tract. The reason for this is the relatively small size of most public bodies in relation to the coal reserves in most Logical Mining Units.

In addition, public bodies should be permitted to bid for a coal tract under the special leasing opportunity program for their proportional coal requirements in a joint public/private generating facility.

3. Any Departmental determination which would result in a limited or no leasing policy for general leasing in any specific coal region should not, in application, preclude opportunity for public body leasing from federal reserves in that region. Public body coal leasing should be a program separate from the general leasing program whose intent is to ensure that qualified public bodies have the opportunity to compete for a fair portion of federal coal resources. If federal coal from any coal region can be made available economically to an interested public body, then we believe this coal should be offered for lease under the special leasing opportunities provision regardless of the standing of general leasing for that region.

4. Because most public bodies do not have readily available sources of front-end financing, deferred bonus bidding should be employed for the public body leasing program.

5. We note that Section 3420.1-4(b)(1)(i) states: "Only public bodies with a definite plan for producing energy for their own use or for two or more of their members or customers shall bid for leases designated as special leasing opportunities for public bodies." We suggest that "two or more of" be deleted, leaving the Section to read: "Only public bodies with a definite plan for producing energy for their own use or for their members or customers shall bid..."

We appreciate the opportunity to present our views on the draft EIS for the Federal Coal Management Program. Resumption of an environmentally sound Federal coal leasing program is essential if this country is to achieve any semblance of energy independence. For public bodies, in particular, resumed Federal leasing - with an active special leasing opportunities program - would be most welcome. For those systems being forced to convert from oil and gas to coal generation, an active Federal coal leasing program is their only hope for reasonably priced coal supplies.

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AMERICAN PUBLIC POWER ASSOCIATION

Brad Koch
NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Milt Chase
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W.H. MARSHALL
GENERAL MANAGER, ENERGY MINERALS
EXPLORATION AND PRODUCING DIVISION

February 13, 1979

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Gentlemen:

By this letter, Mobil Oil Corporation wishes to comment on the December 1978 Draft Environmental Statement (the "Draft Statement") on the proposed Federal Coal Management Program. These comments are directed principally to the proposed Preferred Coal Management Program, (the preferred program), as it is described in Chapter 3 and Appendix A of the Draft Statement. Mobil Oil is strongly opposed to both the procedures incorporated in and the conceptual approach to leasing reflected in the preferred program.

The procedures call for a rigid and highly regulated approach which presupposes the ability of the DOI to forecast supply and demand on a regional basis. The concept appears to be to minimize land available for leasing and to regulate competition. In examining the Draft Statement, we conclude the preferred program would result in non-leasing instead of encouraging competition in the coal industry. Mobil fully supports the position of the American Mining Congress as stated by Mr. J. Allen Overton, Jr., in his response to the proposed program.

The general approach of the Department of Interior (DOI) in the preferred program is to sift and study all lands in its vast inventory to select a few tracts that may or may not then be attractive to potential lessees. This massive undertaking entails lengthy delays and considerable expense. Both the delay and the expense could be minimized by concentrating review and leasing efforts on specific tracts that are known to be of interest to potential lessees. Not only would a lessee-nomination process involve less work and expense, it would also be much more likely to reflect the current dynamics of national coal market forces than a controlled system based on production targets and complicated supply/demand models, which attempt precise forecasts of future

energy requirements. For these reasons, Mobil urges DOI to give further consideration to a process that incorporates a lessee-nomination process.

A fundamental and recurring problem in the preferred program is the unrealistic underlying assumption that DOI can acquire the amount of information necessary to carry out activities required. The setting of production targets and determination of the need to lease additional lands, for example, require the most sophisticated type of analysis. Considering the long lead times between lease acquisition and actual production and the considerable delays and uncertainties that are a part of the pre-production permitting and review processes under the Surface Mining Control and Reclamation Act (SMCRA) and current environmental and land-use restrictions, current leasing decisions will only be reflected in production many years hence. It is not reasonable to expect DOI to be able to predict when there will be a need to lease additional federal lands when it is not possible to know how much of the land already being held for development can be brought to production considering environmental, access and economic problems. If DOI's forecast is in error, it will be years before the government will know it misjudged demand or producing levels to be achieved. By then, it would be too late to compensate and we could be faced with shortages which could have been avoided with a responsive leasing program. The Draft Statement fails to consider the socio-economic effects of a failure by DOI to lease enough land.

After production targets and necessity of leasing determinations have been made, the planning processes contemplated for the preferred program will require the DOI to compare and trade off alternative uses and values for each tract of land studied. The Draft Statement gives little indication how this process will actually occur, but there are strong suggestions that competing uses will be favored over coal leasing and that the coal industry will have little input into the process. The prospect is for extended delays in leasing while this complex approach is developed and results would still be subject to challenge by various interest groups.

In many cases, the DOI may not even be aware a coal resource exists. According to Section 1.3.1 of the Draft Statement, almost half of the federal coal leases issued in the past have required no competitive bidding; indicating that almost half the areas of interest to private industry were not known by the government to have significant coal resources prior to leasing. Under the preferred program, such lands would not be leased. A pragmatic program must receive the input of industry to determine which lands should be open for leasing and to encourage evaluation of potential coal properties.

In addition to these general problems, the preferred program raises a number of questions for which it fails to provide answers. The Draft Statement, for example, gives no estimate of the time or cost required to carry out the preferred program, nor does it compare the preferred program's cost or time requirements with those of alternative programs and the Draft Statement gives no indication how tracts that are eliminated from leasing considerations at any stage of the process may be reconsidered.

The preferred program contains no procedure under which a potential lessee can obtain consideration of specific tracts of federal land that may be essential to its operations on adjacent lands. The necessary federal land may never even be available because it is considered to have low potential for coal, because it conflicts with other land uses for which there are many acceptable alternative sites, because it is considered unsuitable for mining under a number of questionable criteria, because it is arbitrarily set aside for leasing by public bodies or small business, or because DOI's leasing goals have already been satisfied in the applicable region. Even the proposed emergency leasing system will provide little relief if the potential lessee cannot conclusively show that its need for the land resulted from circumstances beyond its control or which it could not reasonably foresee.

The Draft Statement does not provide any mechanism for coordinating the studies required under the preferred program with studies that will later be required by OSM or USGS as the lessee attempts to develop a mine. The potential for wasteful and expensive duplication of effort is high. The preferred program alone contemplates the preparation of four different environmental impact statements prior to leasing.

Mobil particularly objects to DOI's attempts in the preferred program to subject existing leases and preference right lease applications (PRLAs) to the same standards as new federal leases. The preferred program would accomplish an unauthorized change in the meaning of "commercial quantities" in connection with existing PRLAs and would also retroactively affect existing lease rights. Existing lease and PRLA rights cannot be changed by the rules developed for new leases without raising serious legal problems.

The definition of "maximum economic recovery" specified in the preferred program may result in fewer tracts being developed. The definition would require a lessee to mine seams that are not necessarily economic, so long as the overall project is profitable. This definition will severely limit economic returns and will make some federal tracts less attractive than comparable private lands.

The procedures for obtaining the surface owner consents outlined in the preferred program are unnecessarily complicated. The same purpose can be served by requiring a successful bidder to obtain a consent from the surface owner after the sale but before the lease can be issued. This procedure is only contemplated in the preferred program if the Secretary considers a tract "important". Adoption of this procedure for all leases would eliminate unnecessary confusion.

DOI's contemplation of placing end use restrictions on coal mined from federal leases is without authority or justification and has no place in a federal coal management program.

The cost of the preferred program in terms of its impeding coal development in the US and thus forcing more reliance on imported oil for domestic energy needs is tremendous. In times of high inflation and threatened security of imported oil supplies, the proposed coal management program provides little comfort.

Again, Mobil strongly opposes the enactment of the preferred federal coal management program and urges the Department of the Interior to reconsider the objectives of such a program. Early industry input is essential to any leasing program and an alternative system that allows nomination of tracts by potential lessees promises to be much more workable than the preferred program.

Very truly yours,

W. H. Marshall

WHM:mw

SUNOCO ENERGY DEVELOPMENT CO.

February 9, 1979

Office of Coal Management (140)
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Gentlemen:

Sunoco Energy Development Company, a wholly-owned subsidiary of Sun Company, engaged in the acquisition, development, and marketing of coal, uranium, synthetic fuels, and geothermal energy, appreciates this opportunity to comment on the Draft Environmental Statement on a Federal Coal Management Program, dated December 15, 1978.

General

We consider the sections of the DES treating evaluations and assessments of regional environmental impacts to be comprehensive and of such quality and scope as to properly address all levels of potential leasing activity. We have serious concerns, however, about the Preferred Coal Management Program described in Chapter Three. In our judgment, this proposed program has several fundamental problems:

1. We are concerned that some of the laws upon which the program is based do not properly recognize the balance required by our nation's environmental, energy, and economic goals.

2. The land use planning system, as proposed, goes far beyond the President's intent regarding environmental protection, and seriously jeopardizes attainment of coal production goals.

3. The inherent uncertainties associated with utilizing long term projections of coal supply and demand to determine the need for leasing could result in underestimating the levels of leasing necessary to meet our nation's future coal requirements.

4. The potential consequences of a more centralized form of Federal coal management, the exclusion of industry input to the land use planning process, and the prospects of underleasing of needed coal resources on our nation's energy and economic goals have not been adequately addressed.

Specific

Land Use Planning -

Our principal criticism relates to the Secretary's preferred option (No. 3, page 3-30) which states, "Do not use industry information until areas acceptable for leasing have been identified..."

We suggest that industry's input is vital to the land use planning process -

(1) in determination of coal potential

(2) in using unsuitability criteria to screen out certain land areas from further consideration for coal leasing

(3) in making intelligent multiple-use resource management tradeoff decisions

As proposed, application of the unsuitability criteria goes far beyond the President's intent regarding the objective of environmental protection, and seriously jeopardizes attainment of coal production goals.

We suggest that the unsuitability criteria must be considered with full knowledge, including industry's input, of the coal potential of the lands in question, in addressing whether coal mining might be achieved in an environmentally acceptable manner.

We believe the Final Environmental Statement should not only permit, but specifically provide for, input and use of industry information in the land use planning process. A possible means to this end might be a process similar to the BLM proposed Regional Technical Working Groups in various outer continental shelf areas which will address the entire planning process for OCS leasing. We suggest similar advisory groups

could be established for various coal leasing regions, specifically providing for industry representation on each of the groups.

Production Targets -

We have two principal questions regarding this phase of the proposed program:

(1) whether meaningful production targets can be established

(2) whether production targets should be used to establish areas and levels of leasing

We would like to emphasize that uncertainties in both demand projections (e.g., the complexities of transportation considerations, air quality considerations, evolving regulations affecting conversion and use) and supply projections (e.g., geologic unknowns, changing mining and environmental regulations, incomplete data base to estimate potential from existing leases and PRLA's without mine plans) place a high degree of doubt concerning the reliability of such estimates for five, ten, and 15 years into the future. It is particularly worrisome that these targets are to be utilized to establish levels of leasing.

As a specific suggestion regarding the estimates of production from existing leases and PRLA's, we urge that in the required review of the production goals by the Secretary of the Interior (as indicated in the Memorandum of Understanding between the Department of the Interior and the Department of Energy concerning the Establishment and Use of Production Goals for Energy Resources on Federal Land, Appendix B, DES) that the substantial level of information residing in the bureaus and offices of the Department of Interior be carefully and realistically evaluated and conveyed to the Department of Energy. An additional advantage of realistic estimates of production from existing leases and PRLA's would be to facilitate the development of reasonable laws and regulations concerning diligent development.

Finally, if this information is to be utilized, it would seem advisable to examine ranges of production targets and offer sufficient leases to ensure that the leased

resource base is adequate to meet maximum levels of future production. In this regard, we believe the DES does not treat adequately the potential consequences of leasing less federal coal than is needed to meet national energy objectives.

Thank you for your consideration of our views.

Sincerely,

Lamont C. Laue
Manager, Exploration
and Acquisition
Western Coal Division

LCL/ehg



THE RIO GRANDE CHAPTER OF THE SIERRA CLUB

P.O. Box 2311
[illegible], [illegible]
January [illegible], 1979

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[illegible] Draft Environmental Impact Statement, Proposed Federal Coal Management Program

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We have prepared the following comments in response to the draft environmental impact statement on the proposed federal coal management program.

We feel that the proposed program is an improvement over past coal leasing policies in that the need for national coal management is finally recognized. The proposed program is also commendable in that it integrates coal management with land use planning and affords some opportunities for public participation in the site selection process. Finally, we welcome the introduction of lands unsuitability criteria, whereby certain sites can be excluded from consideration for leasing on environmental grounds. Nevertheless, we find serious inadequacies with the coal management program as proposed.

Firstly, the draft EIS and the proposed program itself implicitly assume a critical need for new federal coal leasing and therefore set deadlines for implementation of the program which are inconsistent with the development of adequate land use plans. According to estimates given in the EIS (p. 2-43), resumption of leasing by 1980, the target date, would have no effect on national coal production before 1985 or 1990. Yet production goals set by DOE do not extend past 1990. There has thus been no demonstration of the need to resume leasing by 1980 in order to supplement the current 54 outstanding federal coal leases which contain an estimated 17 billion tons of recoverable reserves. This need may, indeed, be proven in the future; however, a delay in the premature target date of 1980 for resumption of leasing would allow more time for development of adequate land use plans. The proposed coal management program requires complete inventory of resources and development of land use plans as the first step prior to ranking of sites in a region for possible leasing. We do not feel that this can be adequately accomplished before the target date because most current plans, where they exist, are based on incomplete and/or inaccurate resource inventories. In many instances, the BLM has not yet identified Areas of Critical Environmental Concern in those plans, as required by the Federal Lands Policy and Management Act of 1976. We feel these issues must be adequately addressed before resumption of leasing and that the target date must, therefore, be delayed.

The inclusion of lands unsuitability criteria is commendable and is a step in the right direction toward protecting environmentally sensitive areas; however, there are several major flaws in these criteria.

First, the many exceptions to applicability of these criteria to a particular site give the local land managers far too much discretion in applying these criteria. Determination of applicability thus becomes highly subjective and would negate efforts to administer a uniform, national coal management program. For example, the exception applied to the scenic area exclusion criterion would allow mining if the local land managers determine that coal mining would not "significantly diminish or adversely affect the scenic quality of the designated area." The words "significantly" and "adversely" are highly subjective, and phrases containing such wording should be replaced with more definitive guidelines. Furthermore, the burden of proof to the public and to the Office of Coal Management should lie with the local land management agency if it decides that exceptions apply to a particular site.

There are other exceptions which negate the very purpose of the criteria. One example is the criteria dealing with Bald Eagle, Golden Eagle, and Falcon nesting sites. Buffer zones of only 1/4 mile are far too small to avoid disturbance of these highly sensitive birds. Furthermore, coal mining should be prevented at all times within buffer zones and not only during the breeding season. Does the BLM really believe that these birds are immune to disturbance during the remainder of the year, or that they will return to nests which are surrounded by stripped land? Also, the exception allowing nests to be moved in order to allow mining, although requiring risk and Wildlife Service approval, seems to blatantly defy any conceivable logic professing to support sound environmental and wildlife protection. This exception should be eliminated.

Other examples are exceptions 1 and 3 to the criterion dealing with natural areas. The first of these would allow mining in natural areas if the local land managers determine, "with concurrence of the State," that the area or site is only of regional or local significance. Depending on the State agency petitioned for concurrence, this provision may or may not give adequate protection to areas which are highly valued for their natural qualities by local residents. The third exception to this criterion would allow mining in natural areas if the local land managers determine that mining would enhance information recovery from such areas as paleontological or archeological sites. It must be pointed out, however, that new scientific methods and needs are continually being developed in the fields of paleontology and archeology, and information recovery would be enhanced by allowing the resources to remain in situ until needed to answer new, specific questions, rather than recovering these resources immediately in large quantities with the coal. Since this point may not always be appreciated by local land managers, the inclusion of this exception would prove, in fact, to be detrimental to long-term information recovery, as well as to the natural areas themselves.* In our opinion, all of these exceptions must be removed.

The exceptions to the criterion dealing with floodplains are unsatisfactory. The first would allow mining of riverine, coastal, and special floodplains if the local land managers determine that "leasing is the only practicable alternative." This negates entirely the criterion since leases would not be sought on sites where mining interests do not consider it "practicable." This exception should be eliminated. The

*This comment also applies to the same exception included in the criterion dealing with historic lands and sites.

second exception would allow mining where potential for harm to people or property and natural and beneficial values of floodplains could be "minimized." This exception, in our opinion, should either be removed or the above quoted word should be changed to read "eliminated."

Finally, the exception to the criterion dealing with threatened and endangered species should be modified. As it now reads, mining would be allowed if the land management agency determines that the species' habitat would not be adversely affected by coal development, "after consultation with the Fish and Wildlife Service." This should be changed to read "after concurrence with the Fish and Wildlife Service and adequate public hearings." The same comment applies to the exception to the criterion dealing with migratory birds.

We find, as another shortcoming of the proposed program and the draft EIS, far too much emphasis placed on strip mining as opposed to underground mining. This is inconsistent with DOI's Coal Extraction Task Force recommendations that emphasis be placed on underground mining in order to minimize environmental and social impacts. The reasons cited by this group were: to avoid the serious environmental impacts of a large increase in strip mining; to concentrate on the vast majority of the available coal resources which are farther underground; to lower required production level due to the higher energy content of deeper coal; and to provide the smoother growth and sustained production associated with underground mining, as opposed to the boom-bust cycle associated with strip mining. The EIS should address the recommendations of this task force.

Our final comment on the proposed coal management program deals with the question of regional coal production level goals. The EIS (p. 5-23) states that the question of whether or not reclaimed areas in the semi-arid regions of the west could maintain native area vegetation densities for an indefinite period of time has not been answered. The EIS (p. 5-33) also states that radioactive releases from 1000 MW power plants employing eastern coals do not constitute a public health problem but that the lung dose from such plants employing western coals could be significant. These are very important points, but it is not clear from the EIS whether or not these points will be considered when regional production level goals are set. These are definite disadvantages to setting high production goals for western coal and, to a great degree, offset the obvious economic advantages of mining near-surface western coal. Such tradeoffs must be carefully evaluated when regional production level goals are set.

Due to the problems defined above, we consider the draft EIS on the proposed Federal Coal Management Program to be deficient and hope the final EIS and the adopted program will address these issues adequately.

Submitted by:

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February 12, 1979

Mr. Frank Gregg
Director, Bureau of Land Management
Office of Coal Management
Room 3610
Main Interior Building
18th and C Street, N.W.
Washington, D.C. 20240

J68

Subject: Comments Upon Draft Environmental Statement, (DES)
"Federal Coal Management Program"

Dear Mr. Gregg:

El Paso appreciates the opportunity to comment on the subject DES. The comments offered are divided into procedural and technical issues addressed in the DES and the proposed Preferred Program. Implementing regulations for the program will be reviewed and comments offered at such time as these regulations are formally proposed.

Procedural Issues

The Preferred Program as proposed in the DES is complex and does not appear to be one which could be reasonably implemented in an orderly, timely and cost effective manner to allow expansion of coal development in accord with national goals. Furthermore, in the Preferred Program it appears the Department of the Interior (DOI) will have such dominant control of every level of resource development, that effective participation by industry is greatly diminished or precluded.

El Paso is concerned particularly with the implications of the Preferred Program regarding management of current non-producing leases and the proposal to apply the new "unsuitability criteria" to the area of leasehold at the time of Mine and Reclamation Plan submittal. Any initiative by the DOI to change or modify the terms and conditions of the lease based upon criteria resulting from the Preferred Program could have serious ramifications. El Paso believes no greater obligation or responsibility should be imposed upon the holder of an existing, non-producing lease than that represented by the requirement of compliance with the performance standards of the Office of Surface Mining and any applicable state law, and the approval or disapproval of a Mine and Reclamation Plan on that basis alone.

El Paso supports the position of the National Coal Association and its detailed comments on the DES and the Preferred Program and urges the DOI to give due consideration to amending the Preferred Program accordingly.

Technical Issues

The twelve coal regions are not sufficiently delineated. A map of each region should be included in the description of regional environments in Chapter 4. For example, the Black Mesa area in Arizona is shown on Figure 1-1 to be a part of the San Juan River Coal Region. However, the textual description of that region does not include any part of Arizona. The Navajo Indian Reservation comprises most of the San Juan Basin, however, the Navajos are mentioned only in a historical sense.

On page 5-73 and Table 5-44 the term is meaningless. Productivity, being a rate measurement, is a function of time; however, no explanation of the time interval involved is given for the data. Because productivity rates are inherently different among the coal regions, the procedure in this section of comparing productivity differences among regions is invalid. The validity of the productivity levels used throughout the document are suspect.

On page C-12, reference number 15 is interpreted erroneously. Aldon and Springfield (Ref. 15) do not state nor infer that irrigation "may be necessary in subsequent years of extraordinarily low rainfall." In fact, the referenced publication states "At present, research and planning for reclamation at Navajo are based on the premise that irrigation will be used the first year only." The research results as reported in the publication show that, although precipitation in the 12 months following termination of irrigation was only 3.27 inches, a good stand of seeded species was obtained.

The references cited for the sources of the information in Table D-1 are too general in nature for the uses to which the data is put. More site-specific studies should be cited. Much of the data were obtained as values for an entire state and used as regional values. For the San Juan River Region, 11.04 acres/animal unit is extremely low; a more believable value would be 11.04 acres/animal unit month, which would translate to 132.48 acres/animal unit, a more believable figure (USDA, Soil Conservation Service, 1977. Technical Guide, New Mexico: Technical range site description.) The value for productivity of 4.5 tons/acre/year (Table D-1) or 3.2 tons/acre/year (Table H-15) is far too high. The Soil Conservation Service estimates productivity for several range sites in the San Juan Basin to be approximately 500 pounds per acre per year (USDA, Soil Conservation Service, 1977. Technical Guide, New Mexico: Technical range site descriptions). Corn productivity is alleged to be 96.6 bushels/acre/year for the San Juan Basin; however,

the official New Mexico Agricultural Statistics, 1974, produced by New Mexico State University list average irrigated corn production in San Juan County in 1973 as 50 bushels/acre and in 1974 as 60 bushels/acre. The productivities of all crops for which values were found in the literature were below the values used in this document. All regions contain suspect productivity values. Similar productivity values also appear in Tables H-15 and H-17. The calculation of potential loss of animal units does not take into account the data in Table H-14 on allocation of land to various land-use categories; the values are calculated on the basis of each land-use category comprising 100% of the land area. Tables D-5 through D-26 are therefore suspect due to the questionable values used in the calculations of potential losses of plant and animal productivity. The use of computer modeling to derive potential biomass losses does not negate the importance of using a proper data base.

Please feel free to call upon us at any time if you have questions or comments.

Very truly yours,

John M. Craig, Ph.D.
Director, Environmental Affairs

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Comments

of the

Natural Resources Defense Council, Inc.

on the Draft Environmental Statement

for the proposed Federal Coal Management Program

of the

Department of Interior *

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* We gratefully acknowledge the assistance of Stephen Sullivan, John Weiner and Georgia Yuan in the preparation of these comments.

I. INTRODUCTION AND SUMMARY

These comments on the Draft Environmental Statement prepared by the Bureau of Land Management (BLM), Department of the Interior, concerning the Federal coal management program are submitted on behalf of the Natural Resources Defense Council, Inc. (NRDC). For the reasons discussed below, we believe that both the Draft Environmental Statement (DES) and the Department's proposed program for management of federal coal are seriously flawed, and must be revised in order for the Department to achieve its paramount objective -- to ensure that

> "all future leasing must not only conform to, but be a product of, a planning and regulatory process designed to be protective of the environment and of other resources and interests." (p. 2-51) 1/

NRDC is a non-profit environmental membership organization with longstanding and well-known concerns regarding the environmental and other problems associated with the Department of the Interior's management of all publicly-owned resources, including coal. Since its inception, NRDC has engaged in a variety of activities, including litigation, the submission of comments on proposed regulations and impact statements, and consultation with various agency officials in order to ensure that environmental values are fully considered by the Department in its management of

1/ Unless otherwise noted, all page references are to the Draft Environmental Statement.

coal and other resources. Indeed, the preparation of this DES was required by court order as the result of NRDC's successful challenge to the adequacy of an earlier Environmental Impact Statement on federal coal leasing prepared by the BLM. NRDC, et al. v. Hughes, et al., 437 F. Supp. 981, 993 (D.D.C. 1977), as modified, 454 F. Supp. 149 (D.D.C. 1977), appeal pending, No. 78-1656 (D.D. Cir.)

As the Department of the Interior recognizes, this draft statement "comes at a critical juncture in a long history of starts and stops for a federal coal management program... . " (p. 1-1) As indicated, this statement represents the Department of the Interior's second attempt to comply with the National Environmental Policy Act of 1969 (NEPA) in the development and analysis of the coal management program and alternatives thereto. In NRDC, et al. v. Hughes, et al., supra, the District Court for the District of Columbia ruled, inter alia, that the final coal programmatic impact statement released by the Department in 1975 failed to adequately describe the management program with which it dealt, that it failed to consider reasonably available alternatives, and that it failed to address the question of the need for a new leasing program in light of the magnitude of coal already under lease. 437 F. Supp. at 988-991. Consequently, the court enjoined the Department of the Interior from "taking any steps whatsoever

directly or indirectly to implement the new coal leasing program" except under certain specific circumstances, and ordered it to prepare an EIS which fully complies with NEPA. Id. at 993-994.

In addition, the program with which this impact statement deals, i.e., the "preferred alternative," constitutes the Department's third attempt since 1970 to develop a comprehensive coal leasing program to replace the uncontrolled and passive leasing policy of the past and to avoid the adverse environmental and other impacts which had resulted therefrom. See Comments of NRDC on the BLM's Proposed Federal Coal Leasing Program (DES 74-53) (August 2, 1974), p. 17. The first attempt, EMARS I, was an ill-described program, Id., pp. 23-27, in which the Department would relate "inventoried Federal coal resources to national projections of coal-derived energy needs." NRDC v. Hughes, supra, 437 F. Supp. at 984 n. 8. The Department subsequently replaced EMARS I with its second attempt at a comprehensive management program, EMARS II. Under EMARS II, the coal industry was to nominate the areas and tracts to be considered for leasing. The substitution of EMARS II for EMARS I was made "without [the]... proper explanation." Id. at 989.

Finally, the currently preferred alternative and the instant draft impact statement represent the Department's first comprehensive attempt to respond to the broad requirements of three major statutes recently enacted by Congress -- the Federal Land Policy and Management Act of 1976 (FLPMA), Pub. L. 94-579, 43 U.S.C. § 1701 et seq., the Federal Coal Leasing Amendments Act

of 1975 (FCLAA) Pub. L. 94-377, 30 U.S.C. § 181 et seq., and the Surface Mining Control and Reclamation Act of 1977 (SMCRA), Pub. L. 95-87, 30 U.S.C. § 1201 et seq.

The preferred alternative described in the DES presents the structure of a rational approach to the management of the Nation's coal. It integrates coal management decisions into the broader context of resource management. It establishes a cyclical process for the evaluation of the need for the leasing of Federal coal. It describes procedures intended to assure the development of that coal first which will cause least damage to the environment and to prevent development of coal which would cause irreparable environmental harm.

Closer scrutiny, however, reveals that the preferred alternative is full of flaws and ambiguities. The machinery for its implementation, to the extent it is visible through the DES, is ill-constructed. It leaves discretion where it should set standards. It relies on the products of previous management systems when it should start anew. It seeks, above all, to assure that more than enough coal will be available, although the President's Environmental Message of May 23, 1977, FLPMA, FCLAA and SMCRA mandate that first consideration be given to the environment.

The DES as a whole fails either to meet the specific requirements imposed by NRDC v. Hughes, or the broader mandates of NEPA.

A programmatic impact statement represents a task unique in Federal policymaking. It imposes a nondiscretionary duty upon Federal officials to think in a certain way about discretionary acts. The programmatic impact statement is a vehicle for introducing human environmental values into the decisional process. It is designed to affect and inform that process from its earliest stages, yet is required to be made public, subjected to public scrutiny and comment, and to be responsive to public views. The programmatic impact statement requires an agency to consider values outside its mission at the very moment it develops the basic policies for carrying out its mission. It requires comprehensive analysis which ranges far outside the normal ambit of an agency's responsibility. For this reason the programmatic impact statement is unique and essential. It is virtually the only process for effectively addressing such broadscale human concerns.

Fare more comprehensively than its predecessor, the DES addresses critical issues. But the analyses begun are often left incomplete. Discrete topics are described but remain isolated, unconnected by analysis. The treatment of the need for leasing is critically deficient. The description of the preferred alternative is inadequate. The description of the environmental and other impacts which will result from the development of Federal coal is inadequate. Important issues, including the rehabilitation of mined lands, are treated only

cursorily. The alternatives considered are not genuine alternatives, but rather fragments of alternatives.

The flaws in the preferred alternative and the DES are oversahdowed, however, by the frenzied drive to prepare for a mid-1980 lease sale. These preparations are proceeding in a manner inconsistent with the preferred alternative. They have left the DES and the decision which it is designed to inform far behind. Therefore, we turn first to the coal leasing program which is already being implemented.

II. PREPARATION FOR A MID-1980 LEASE SALE UNDERMINES THE NEPA PROCESS

Memoranda written by the Director of the Bureau of Land Management (BLM) and the Directors of the Western Coal State Offices of the BLM reveal a strenuous and systematic program to prepare for a mid-1980 lease sale. The program, directed specifically toward the identification of forty lease tracts in time for the 1980 sale, requires updating of MFPs prepared for coal management under EMARS II and the Application of the draft Lands Unsuitability Criteria. The 700,000 acrhs of land to be reviewed as part of this program have not been selected pursuant to comprehensive resource planning. There has been no intraregional evaluation of competing values. The criterion by which the selection was made was simple. "Focus on planning areas where completed MFPs delineate areas potentially suitable for coal leasing to meet short-term (1980) leasing goals."

Supplement to Planning and Budget for Coal Leasing 1978-1980, June 9, 1978, p. 5.

Almost a year ago, the Department instructed state Directors to direct "present work efforts into those planning units which offer the best opportunity for near future coal resource management," and emphasized that it "is particularly important that we place FY 78-79 emphasis towards meeting the mid-1980 objective for leasing, if required." Instruction Memorandum No. 78-157, March 27, 1978.

A few months later, an Office of Coal Management document identified

> 2.4 million acres in six western states which under existing planning criteria are suitable for coal leasing. These areas will require the least amount of effort to pudate and refine in accordance with the departmental policy and suitability criteria after July 1978." Supplement to Planning and Budget for Coal Leasing 1978-1980, June 9, 1978, p. 2.

The document discussed "a recommended approach for activity planning to meet the 1980 coal leasing goals," id., p. 1, and outlined specific steps to be taken. Id., pp. 3-5. The document repeatedly refers to production of a "Departmental policy on coal leasing by July 1978." Id., p. 1, also see pp. 2, 4.

It is significant that that the document's authors contemplate the completion of the Department's coal policy in July 1978 (five months before the new draft EIS was even published). In a Memorandum dated June 30, 1978, the selection of the "Preferred Alternative" was announced. Memorandum from Executive Secretary "Secretarial Issue Document, Coal Policy Issues and Options."

The Bureau of Land Management almost immediately began to implement the new policy.[2/] In a memorandum addressing "Planning for Mid-80 Coal Leasing, If Needed," the Director of the BLM instructed the State Directors of Colorado, Montana, New Mexico, Utah and Wyoming, consistent with the "leasing strategies preferred by the Department," to complete all of the steps necessary for leasing, short of tract identification, by June 1, 1979:

> The purpose of this memorandum is to stimulate the inventory and planning effort required to place the Bureau in the position of being ready to identify tracts to be analyzed by June 1, 1979, for coal lease offer in mid-1980 if needed.
>
> You have been furnished with the Solicitor's opinion of May 22 which provides legal guidance and advises we can develop plans under the court order of September 27, 1977, to the extent that we identify lands suitable for coal leasing in a planning unit.
>
> You have recently developed MFP's for some areas of medium or high potential for coal development in the last several years. High priority planning units have been identified to the task force on planning/budget, and additional funds for planning in FY 1979 have been requested. A number of coal-planning positions have been allocated to you during the last several years for continuing such efforts.

2/ It was not however full scale resource management which was initiated, but the limited coal oriented program months later referred to the DES in a cryptic section headed "Start-up Special Considerations" (DES, p. 3-28).

> We know the leasing strategies preferred by the Department will all rely on the surface management agencies' planning systems to identify areas suitable for coal leasing; this can be done by June 1, 1979.
>
> We would like to use the period of September 1978 through March 1979 to review and revise the areas planned for coal only in selected recently completed MFP's on high potential coal deposits, to insure that these plans are consistnet with current Departmental policy and ready for use in developing the mid-1980 coal lease offer options. Doing this will involve the following steps, to be completed by March 1979[.]

Instruction Memorandum No. 78-381, July 19, 1978 (emphasis in original).

The process described in Instruction Memorandum 78-381 constitutes implementation of the "preferred alternative," and it is not a part of a general and comprehensive land use planning process. It is solely and specifically designed to prepare for a mid-1980 coal lease sale. IM 78-381 does not order consideration of coal resources in the contxt of resource management activities. It explicitly cautions the State Directors "to review and revise the areas planned for coal only . . .." (emphasis in original).

After meeting with the State Directors, the Director issued further instructions specifying that the review and revision process should "include acreage sufficient to result in at least 10 potential lease tracts . . ." in each of four states. He added that the "exact process" for "a 1980 sale has not yet been designed. This is a major priority for the Office of Coal Management, in cooperation with OCLPC, over the next two months."

Facsimile Message No. 78-85, September 21, 1978.

BLM State offices responded with a flurry of activity. The Colorado State Director advised the Director of BLM that although fiscal year 1978 was nearly over, leaving "a short time frame to complete the work," the Colorado State Office might "be able to update existing MFPs to allow for a subsequent coal-lease offer in mid-1980." This he attributed to the existence of "the West-Central Colorado Coal ES and Northwest Colorado Coal supplemental report covering the planning units where leasing is anticipated . . . ." He noted that "within these general areas, we have specific tracts identified." Memorandum from State Director, Colorado, to Director, August 7, 1978 (emphasis supplied).

The Montana State Director in three separate memoranda to the Director reviewed his plans to "facilitate an adequate supply of areas acceptable for further consideration for leasing" but complained that the "[t]imeframes for tract identification, selection, ranking, regional ES, and sales schedule are too compressed, but the situation is understood." Memorandum from State Director, Montana, to Director, November 24, 1978, at 2-3. He ntoed that the need for haste might lead to "a less than adequate [regional environmental] analysis," Memorandum from State Director, Montana, to Director, September 26, 1978, at 1, and that it would be necessary to "rely heavily" on existing and possibly insufficient data. Memorandum from State Director, Montana, to Director, August 15, 1978, at 1.

A major step in the preparations for a mid-1980 lease sale is the application of the draft Lands Unsuitability Criteria. See 43 Fed. Reg. 57662, et seq. (Dec. 8, 1978); 44 Fed. Reg. 2201-2202 (Jan. 10, 1979); DES, p. 5-141. Although the criteria are an integral part of the preferred alternative, they are being applied before they have been formally promulgated, and exposed to public review and comment. The Department has characterized the application of the criteria as a "test" and asserted that, because it can "change the MFPs if necessary to comply with the final regulations," the "process does not irretrievably or irreversibly commit any resources." 43 Fed. Reg. 57664 (Dec. 8, 1978).

The urgency of the Department's efforts to prepare for a mid-1980 lease sale renders that assertion ridiculous even if technically correct. Substantial changes in the criteria would require major revisions; major revisions that would have to take place during the summer and fall of 1979. The Department's planning documents state that in order for the mid-1980 lease sale to take place application of the criteria must be completed by April 15, 1979. Facsimile Message 78-85, September 21, 1978, p. 2, and revision of the MFPs must be completed by June 1979. See Instruction Memo 78-381, July 19, 1978. Thus, any meaningful change in the criteria would render leasing in 1980 impossible.

The consequence of the massive effort to be ready to lease by mid-1980 is that a coal leasing program is being implemented, once again without prior consideration of the need for and effects

of leasing. However careful the analysis in the final programmatic impact statement may be, it will come more than a year too late. It is inconceivable that the program, already forging ahead on the tight schedule, with an enormous commitment of resources, will be canceiled or significantly modified in response to the comments on the draft ES not yet even submitted.

Because of the demand for haste, the ghost of EMARS II stalks throughout the process. The lands being reviewed are those subject to nine existing MFPs. Those MFPs were prepared and updated for use under EMARS II, not the sustained yield, multiple use mandate of FLPMA, or the environmental requirements of the President's Environmental Message and SMCRA. The data they provide was collected to answer questions asked under EMARS II, not the "preferred alternative."

Finally, most of the important decisions for the mid-1980 sale will have been made without public participation. The process will have been underway for nearly a year before the public has even commented on the draft programmatic impact statement. The lands unsuitability criteria have not been published for co-ment except as a part of the draft statement. By the time the BLM planning regulations and the coal program regulations are promulgated, the mid-1980 lease sale will have progressed to the point of tract identification.

The issue in NRDC v. Hughes was the adequacy of the final Environmental Impact Statement prepared on the Energy Minerals Activities Recommendation System (EMARS II). The Court concluded

that the EIS was inadequate. It found both the explanation of EMARS II and the consideration of alternatives to be insufficient. The court specifically referred to the necessity that the Department consider the need for any leasing at all, and ordered the Department to prepare a new draft impact statement and the Secretary of the Interior to

> personally reevaluate federal coal leasing policy, based on information contained in the new final EIS, and to make a new decision as to whether a new leasing program shall be instituted and, if so, what kind of program it should be.

Natural Resources Defense Council v. Hughes, supra, 437 F.Supp. at 994 (emphasis added).

Until that task is complete, the Department is enjoined from taking "any steps whatsoever, directly or indirectly, to implement the new coal leasing program . . . ." 437 F.Supp. at 993.

The Department has apparently concluded that the provision of the Court's order, as modified, which permits the "preparation of comprehensive land use plans," 454 F.Supp. at 152, forbids only implementation of EMARS II and the identification or leasing of tracts. 43 Fed. Reg. 57663 (December 8, 1978); Memorandum from the Deputy Solicitor to the Director of the Bureau of Land Management "Planning and Data Collection Efforts Under NRDC v. Hughes," at 1-2. Such a conclusion is incredible in the context of the decision of the court. The order of the court explicitly bars implementation of "the new" (emphasis supplied) coal leasing program; the point of the order is to compel the Department to properly complete the EIS process before it adopts, let alone implements, a new program.

The language which permits land use planning to go forward is addressed to comprehensive planning which incidentally involves consideration of coal. Yet the Department has instituted planning activities directed only to the leasing of coal.

We regard the Department's violation of the court's order as so complete as to render the Programmatic Impact Statement functionally irrelevant. The Department's memoranda and actions suggest that the decision to lease and to lease soon was made before the basic tasks imposed by the court were even addressed. The Impact Statement will inevitably turn into an effort to justify that decision rather than a means to inform the decision-maker.

This is particularly distressing because the evidence is so strong that early leasing is unnecessary. See Section III.A., infra. Indeed, the principle justification suggested in the DES is that additional leasing may be necessary by 1990 and bureaucratic and start-up delays may be such as to cause up to seven years delay (DES, p. 2-43). Even this figure would not justify immediate leasing, and most of the dealys referred to in the DES will be eliminated if the Department simply goes forward with systemmatic resource management decisions, unharried by leasing pressures.

Such an approach would permit comprehensive review on the basis of adequate data. It would allow the Department to effectively guage the effects of diligent development requirements and changing energy demand trends.

The time needed to establish and implement a sound and comprehensive management system is availble to the Department. The Draft Environmental Statement reveals that adequate supplies of coal are available to meet short-term needs. It shows that potential production from existing leases and planned production from private lands will be sufficient to meet low and medium projections of demand through 1985, and to meet the low projection of demand through 1990. As we discuss more fully below, the higher demand projections presented in the statement overestimate future coal demand by a substantial amount. Furthermore, the Department's estimate of planned and likely production does not include the production potential from existing preference right lease applications. It is therefore most unlikely that additional Federal leasing will be required in the near-term future to meet the nation's demand for coal.

It is equally clear that the Department should take the time needed to ensure proper management rather than attempt to meet its arbitrary 1980 deadline for new leasing. As we stated in our comments on the previous draft coal programmatic EIS:

> "Coal is an important, irreplaceable natural asset that must be consumed judiciously if we are to act properly as 'trustees of the environment' as required by NEPA. Although the United States is generously endowed with coal compared to the rest of the world, that does not mean this resource is so abundant that we do not have to be concerned about its rate of use or how it is extracted and used. Because coal is

> the nation's major potential source of hydrocarbons, which form the basis for synthetic materials, including plastics and pharmaceuticals, we should not allow immediate consumption to penalize future generations that may rely heavily upon coal for these vital needs. This is especially important in light of the relatively rapid depletion of alternative hydrocarbon resources such as natural gas and petroleum. Thus, on this basis alone, the presumption should be to keep coal mining and utilization to the lowest practicable levels.
>
> Also, there are important health-related and environmental reasons for not using coal directly for production of electrical energy. These are the same reasons that coal utilization in power plants, until arrival of the 'energy crisis,' has decreased markedly during the past two decades.
>
> Earlier surface-mined areas have not been adequately 'rehabilitated' and proposed areas for leasing in the West may not be capable of being 'rehabilitated' at reasonable financial cost. Coal-fired power plants release huge quantities of ash, sulfur oxides and toxic trace minerals, and, in some cases, radioactive materials. It is these very undesirable aspects of coal utilization that should argue strongly for minimizing the leasing and mining of coal."3/

3/ NRDC Comments, pp. 8-9; (footnotes and references omitted).

III. THE INADEQUACIES OF THE DES

The Department asserts that this DES corrects the defects in the previous final coal programmatic EIS that were identified by the Hughes court and responds to the major issues raised by commentators on both the draft and final versions of that statement. (p. 1-12) Although the DES is an improvement over the earlier versions in some respects, it suffers from the same kinds of fundamental problems from which they suffered.

A. The DES Does Not Adequately Assess the Nation's Need For Federal Coal.

1. The order issued by Judge Pratt in NRDC v. Hughes points to the importance of performing a thorough analysis of need for coal in making the determination of the appropriate federal coal policy.

An important issue in Judge Pratt's consideration of the adequacy of the Final Environmental Impact Statement on the Proposed Federal Coal Leasing Program (FES 75-80) was the question of whether additional leases were needed in order to provide enough coal to meet the nation's energy requirements. In our comments on the 1974 DES, we argued that the requirements could be met without additional leases. Judge Pratt concluded from these arguments that,

> "In light of these statistics, [showing that coal then under lease could meet demand for many years], the threshold question as to whether the proposed policy is even necessary should have been addressed and considered in depth." NRDC,et al. v. Hughes, et al., supra, 437 F. Supp. 991 (emphasis in original).

Obviously, Judge Pratt considered the issue of coal demand to be fundamental to the evaluation of federal coal management policy options.

As the Department of Interior itself admits in the DES,

> "The failure of the Department to show the need for leasing was cited by the Court in NRDC v. Hughes as a principle defect in the previous coal leasing programmatic environmental impact statement...." (p. 2-43.)

While the Department has attempted to comply with the Hughes order by addressing the question of the need for additional leasing in the new Statement, its discussion of this issue is little more than a rationale for the preferred program. Once again, the Department has failed to establish that there is a need for the coal that additional leasing would provide. Thus the "threshold question" as to whether the preferred program is needed has not yet been answered. We believe this failure is a major inadequacy of the Statement.

2. A review of the projections of coal demand and supply estimates shows that new leasing is not needed to meet near-term energy requirements.

a. Both the Department of Interior and the Department of Energy admit that demand can be met through 1985 in the "low" and "medium" scenarios, and through 1990 in the "low" scenario, without new leasing. In response to a request by the Department of Interior (DOI), the Department of Energy (DOE) prepared a range of projections of production required to meet demand for coal in 1985 and 1990. DOI then compared the DOE projections with its own estimates of planned and likely production as a basis for judging the need for additional Federal coal development. The comparison shows that total planned and likely production for 1985 exceeds the DOE low projection by about 120 million tons; the medium projection is exceeded by over 30 million tons. (p. 2-45.) Similarly, the low 1990 projection is exceeded by about 50 million tons. (p. 2-46.)

The Department of Interior admits that,

> "With the addition of likely production from existing federal leases not now included in mine plans, there would appear to be little difficulty in achieving the DOE low 1990 projected production levels without further leasing if all planned production materializes." (p. 2-44.)

On the other hand, the high DOE projection for 1985 and the high and medium projections for 1990 exceed the DOI estimate of total planned and likely production for those years. However, as the Statement notes,

> "The fact that currently planned and likely production, together with the production potential from PRLAs,* is not sufficient to reach high and medium 1990 DOE production projections does not mean that these projected levels could not be attained without new Federal coal leasing." (p. 2-47)

In the study from which the production projections were taken, the DOE also concluded from its own comparison of production expected to take place regardless of future federal leasing actions, with the need projections that:

> "It must be emphasized that these production shortfall estimates do not indicate that new leasing is needed. Rather, the shortfalls could be met by an expansion of existing approved mining operations, development of existing non-producing leases, expanded development of non-federal coal, additional leasing or any combination of these policies." 4/

* PRLA production potential is not included in the comparison discussed here.

4/ Federal Coal Leasing and 1985 and 1995 Regional Coal Production Forecasts, Leasing Policy Development Office, Department of Energy, June 1978, Executive Summary, pp. 10-11.

This conclusion is given added weight by the fact that DOE's estimate of the gap between likely production without new leases and coal requirements was significantly greater than that of DOI.

In short, initial inspection of the coal need projections and the DOI estimate of total planned and likely production suggests that immediate resumption of federal coal leasing is far from a necessity. Furthermore, the DOI comparisons tend to exaggerate the need for additional leasing, due to the exclusion from the comparison of additional potential coal production and to the overestimation of future demand for coal. Our analysis below of the assumptions used in making the supply and demand projections displayed in the statement shows that there is little evidence to support the Department of Interior's contention that there is an urgent need to establish a program for the immediate resumption of Federal coal leasing.

b. The estimates of demand used by the Department in its analysis of the need for leasing are unrealistically high. The Draft Environmental Statement contains two sets of need projections, the first of which were developed by the Department of Energy in the study referenced above, and the second of which consists basically of the DOE projections as modified by the Department of Interior. Since the two sets are based on similar assumptions regarding total demand levels, we restrict our comment here to the initial set of projections prepared by DOE. Due primarily to unrealistic

assumptions about the rate of growth in electricity demand and the consumption of western coal in the East, we believe that the DOE production projections are based on exaggerated estimates of demand. These issues, along with a number of other factors which resulted in inflated demand estimates, are discussed below.

The DOE projections of sectoral coal demand indicate that the electric utility sector will continue to dominate coal demand, representing 68% of the medium case demand in 1985 and 66% of the medium case demand in 1990. (p. 2-26.) Thus, the assumptions regarding growth in electricity demand are key to the analysis of total demand requirements.

The DOE projections assume that electricity demand will grow from 1977 to 1985 at the rates of 4.4% per year in the low case, 4.8% per year in the medium case, and 5.8% per year in the high case. The level of population growth, estimates of future cost of electricity to the consumer, and amount of conservation underlying these projections are not specified, making it difficult to perform a detailed analysis of the projections. However, a comparison with the actual rate of growth in national electricity demand which has occurred during the period following the oil crisis of 1973, 3.9% per year, 5/ indicates that the DOE assumptions represent a relatively high

5/ Calculated from data for 1972 and 1977 in Monthly Energy Review, Energy Information Administration, Department of Energy, December 1978, p. 55.

estimate of future growth in electricity demand, rather than a realistic range. Considering the fact that much of the reduced electric demand growth rate in the past five to six years was due to the institution of conservation measures which could be achieved easily on a short-term basis and in response to price increases small by comparison to long-term prospects, we believe that the long-run response to increasing electricity prices has only begun to emerge, and that, as a result, overall demand growth rates will continue to drop.

As the draft statement points out, the DOE projections of demand are based on a macroeconomic analysis which relates energy use to variables such as income. (p. 2-25.) The Statement also notes the existence of an "alternative approach currently ... employed in California." (p. 2-25) The alternative approach referred to, known as end-use analysis, produces forecasts of energy demand which are much more consistent with recent trends than does the econometric approach used by DOE. The Department of Interior claims that:

> "To complete the comprehensive inventory on a nationwide basis with the survey method used in California would take considerable time and resources." (p. 2-25)

The fact is, however, that much of the preliminary work needed to perform such an assessment on a national basis has already been done as part of a study by the National Academy of Sciences' Committee on Nuclear and Alternative Energy Systems, in which a great deal of data was collected on national energy consumption by sector. Although this study has not yet been published in entirety, the demand analysis results are

summarized in an article entitled "U.S. Energy Demand: Some Low Energy Futures" (Science, 14 April 1978, pp. 142-152.)

The Department of Interior stated that,

> "If it should prove desirable, it will be possible for the Federal government to undertake the kind of end use modeling carried out in California or other alternatives to the DOE methods used for current projections." (p. 2-25.)

In view of the importance of reliable demand projections in formulating a rational Federal coal policy, we believe that the Department should re-evaluate its need projections using this methodology, before establishing a new leasing program.

The DOE production projections cited in the Statement also overestimate the extent to which western coal will be used to meet future demand for electricity. While the Department of Interior states that "the most important sources of increased demand for western coal are in the West itself," (p. 2-25) western production is projected to grow much more rapidly than western consumption. For example, under the preferred program, medium production of western coal in 1990 would be more than six times greater than the amount produced in 1976. (p. 5-11.) In contrast, western coal consumption would only triple in the same period. (p. 5-13.) Western production in the preferred program medium projection would exceed western consumption by 445 million tons. The draft Statement is therefore somewhat misleading in alleging that,

> ". . . most new demand for western coal will be from power plants and industries in the West. The growth in coal demand is expected to be higher in the West than in any other region of the country." (p. 2-10.)

While the Department's figures indicate that western coal demand will grow at a faster rate than eastern demand, the absolute increase in consumption is projected to be far greater in the East than in the West. (p. 5-13)

The extent to which western coal is used in the East will depend largely on the strictness of the New Source Performance Standards, to be promulgated soon by the Environmental Protection Agency. The medium and high coal demand projections assume that the New Source Performance Standards will require a lower level of flue gas desulfurization on low sulfur western coal than on eastern coal, (p. H-4.) which would lower the cost of western coal and increase eastern demand. Only the low projection is based on the more realistic assumption that 90% flue gas desulfurization would be required on all new plants, regardless of coal type. While it is not certain that EPA will adopt the stricter standard, all new coal plants located in Prevention of Significant Deterioration (PSD) areas will be required to use Best Available Control Technology, which the states can interpret to be greater than the lower desulfurization levels assumed for the medium and high demand projections. For example, in California the Air Resources Board and Pacific Gas and Electric Co. have agreed that the proposed "Fossil" coal plant, if built, will meet a

95% flue gas desulfurization limit.[6] If eastern states follow this trend, there will be little incentive for eastern utilities to burn western coal.

The DOE coal need projections used by the Department of Interior are also overstated because they are based on underestimates of the costs of using western coal. The DOE model used to project coal demand and supply is structured so as "to minimize the total delivered costs of energy to the demand sectors in all regions. . . ."[7] However, the approach used resulted in an underestimate of the costs of coal production and transportation. Although "economic criteria were used to determine the relative cost of coal production from each regional production area,"[8] it does not appear that the Department of Energy has taken into account explicitly the additional costs which will be imposed by environmental protection actions required by the new Federal leasing program. The DOE model also underestimates the transportation costs of providing the amount of coal considered in each projection by assuming that railroad hauling rates will rise only at the same rate as the general inflation rate of the overall economy. It is difficult to believe that the high

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6/ Stipulation re BACT in the Matter of Notice of Intention by Pacific Gas and Electric Co. to file an Application for Certification regarding the Fossil 1 and 2 Project, 1/10/79, Docket No. 77-NOI-4.

7/ DOE, op. cit., p. 58.

8/ Id., p. 64.

capital investments which will be required to expand the existing transportation system are factored into this assumption.

The DOE model therefore appears to have underestimated the costs of both producing and transporting coal, an error which will result in unrealistically high estimates of demand for the coal.

Another factor which will result in the likelihood of demand levels lower than projected by DOE is the recent authorization granted to the EPA to require the use of local coal. Provision for such authority was included in the Clean Air Act Amendments of 1977, but:

> "Given that the fate of this provision is unclear, it was not included in any of the [DOE] scenarios." 9/

Subsequent to the preparation of the DOE report, however, the EPA was indeed granted such authority, and has already proposed in at least one case to issue an order to require Ohio utilities to use Ohio coal.

> "Resolution of this precedent-setting 'local coal' case may well determine the market for western coal in other midwestern areas, such as Illinois."10/

Finally, we believe that the DOE demand projections are overstated due to inflated estimates of production requirements for industrial consumption, synfuel production and exports.

9/ Id., p. 102.

10/ Western Interstate Energy Board Newsletter, 5 January 1979, p. 8.

The DOE mid-range and high industrial demand projections expressed in terms of Btu's are expected to more than double between 1975 and 1985.11/ The largest regional industrial demand would be from the West South Central region, which includes Texas, Oklahoma, Arkansas, and Louisiana. Industrial demand in this region is expected to increase by a factor of over fifteen. Given the recent natural gas glut, it is preposterous to assume that conversion of existing industrial facilities will occur at the rate required to result in such a fantastic increase in coal demand.

The DOE estimates of coal required for synfuel production and exports, while only a small part of the total demand projection, are similarly overstated. For example, the low projection for 1985 was based on the assumption that seven (presumably liquefaction) plants with a capacity of 10,000 barrels per day each will be in operation by 1985; the medium and high projections assume thirteen and twenty-seven plants respectively.12/ In view of the extensive Federal funding which will be required to make such facilities available on a commercial scale in the near future, we question the realism of these estimates. While DOE is anxious to encourage these technologies, it is currently having difficulty obtaining adequate funding from Congress for even a limited number of liquefaction and gasification plants. See The Energy Daily, January 30, 1979.

11/ Id., p. A-5.

12/ Id., p. 103.

We therefore believe that a projection of seven plants by 1985 would be optimistic even for the high demand scenario.

We also question the assumption that exports will increase by nearly 50% between 1977 and 1985 as is indicated in the DOE projections. (p. 2-26) First, if demand is to grow domestically at the rate assumed in this analysis, it would be more likely that exports would be displaced to meet domestic demand. Second, it seems inappropriate to us that foreign demand for coal should be included in the consideration of whether to lease additional federal lands for coal mining. In any event,the assumptions which determine this estimate of demand should be discussed.

c. The estimates of planned and likely coal production used by the Department in its analysis of need for additional leasing are too low. The Department of Interior's estimates of total planned and likely production with which the DOE need projections are compared include planned and likely production from mines on existing Federal leases, planned production from Indian Lands and planned production from wholly non-Federal mines. (p. 2-45)Not included, however, is the production potential from outstanding Preference Right Lease Applications. Thus, the estimate of total coal supply likely to be available in the late 1980s without new Federal leases is significantly understated.

The Department gives no explanation as to why it excluded preference right lease application production potential from its estimates of total coal availability, although it does state that:

> "It is unlikely that many preference right lease applications could be processed, leases issued, and production begun from these leases by 1985. The production potential of preference right lease applications is of importance mainly in considering 1990 production projections." (p. 2-44)

While we would not argue for rapid processing of preference right lease applications, it appears to us that they could be developed just as rapidly, if not more quickly, than could new leases. Although the Department acknowledges, as quoted above, that preference right lease application production could contribute to meeting 1990 coal requirements, it does not even include preference right lease application production in its estimate of planned and likely production for that year. We therefore suggest that the production potential from preference right lease applications be considered on a par with the rest of the planned and likely productions used by the Department for purposes of comparison with the need projections.

In order to have a clearer picture of the total availability of coal without new Federal leasing, we review the Department's estimates of preference right lease application production potential. Total annual production potential from applications about which there are no legal or environmental questions is estimated to be 250.8 million tons, which represents over half again the Department's estimates of total "planned and likely production." In the table below, we add the preference right lease application potential to the planned and likely production and display it beside the low, medium and high DOE need projections for 1985 and 1990.

COMPARISON OF POTENTIAL COAL PRODUCTION

WITH THE DOE NEED PROJECTIONS

	Planned & likely production	PRLA potential	Total potential production	DOE Projections		
				Low	Medium	High
1985	422.2	250.8	673.0	299.8	391.1	438.7
1990	419.3	250.8	670.1	366.5	659.7	922.1

The table indicates that, with the development of the potential from existing preference right lease applications, new Federal coal leasing would be conceivably required only to meet the high DOE demand projection in 1990. All three demand projections for 1985 could be met without additional Federal leasing, as could the low and medium projections for 1990.

d. The Department of Interior's position regarding the need for new leasing under a low demand growth scenario is incorrect. As indicated above, the Department explicitly acknowledges that the planned and likely production levels would be adequate without additional Federal leasing to meet the DOE low and medium demand projections for 1985 and the low demand projection for 1990. It states that new leasing would be required nevertheless even in those cases, due to the fact that low demand growth would result in a failure to develop many existing leases in time to satisfy the diligence requirements. In contrast to the implication elsewhere throughout the statement that coal demand will grow rapidly, the Department contends that, "[t]he most important potential constraint [on planned production] is lack of demand." (p. 2-30)

The Department argues that if demand is not strong enough to stimulate development of existing leases by 1986, the enforcement of diligence requirements will result in the cancellation of these leases, necessitating new leases in order to meet demand by 1990:

> "As noted the enforcement of diligent development requirements would mean that, aside from expansions in already operating mines, increases in production of Federal coal after 1986 will have to come from new Federal leases." (pp. 2-50, 51) (emphasis added)

The argument does not make sense, however, in view of the fact that the Secretary of the Interior has discretion to extend that period for five years.[13/] Furthermore, if demand is insufficient to stimulate production on existing leases, we do not understand how it can be so great as to require new leasing. We therefore disagree with the conclusion that,

> "... the only forecast that leads to a wholly unambiguous need for new leasing is achievement of 1985 medium or high production projections, followed by a sharp downturn in demand resulting in little if any further increases in production to 1990." (p. 2-44)[14/]

[13/] This is not to argue that such a policy is desirable. Indeed, we recommend that the Department move as quickly and aggressively as possible to determine whether existing leases can and should be developed. In the event, however, that coal demand does not grow as quickly as anticipated, it may make sense in many cases to extend the diligence period rather than to cancel an existing lease and subsequently issue a new lease.

[14/] It should also be pointed out that such a scenario is not at all unlikely, since the full impact of many new conservation programs will not be felt on demand levels before 1985.

3. The draft environmental statement does not give adequate consideration to alternatives for meeting the nation's energy demand.

As we pointed out in our comments on the draft programmatic statement issued by the Bureau of Land Management in 1974, the statement must contain a thorough consideration of "the major, national energy alternatives to the proposed...program".[15/] We also suggested in our earlier comments that it may be preferable to base the comparison of alternative energy options on a careful consideration of the tradeoffs between different energy sources in a programmatic environmental impact statement for the National Energy Plan. In the absence of such a statement, it is incumbent upon the Department of Interior to provide as thorough an analysis of the alternative energy options as possible in order to develop a rational Federal coal leasing program which will best suit the needs of the nation.

Rather than performing such an analysis, the Department of Interior appears to have accepted with little thought the assumption that expanded use of coal represents the main avenue for achieving the goal established in the National Energy Plan of reducing projected increases in imports of foreign oil. A brief examination of the Statement's discussion of the availability of other energy resources points out its inadequacy in this regard.

The discussion of production trends in oil and natural gas ignores a number of recent developments which will effect national energy policy regarding coal use as well as the demand for coal. First of these is the impact of Alaskan oil production

[15/] NRDC Comments, op cit., p. 65.

on the California energy situation. California, which now has a surplus of crude oil due to the new Alaskan supplies, is currently working with the Federal government to allow greater use of oil. This development, combined with other factors, makes it unlikely that California will be in the market for many coal-fired power plants within the next decade.

Another important development is the Department of Energy's recent recognition of the vast Mexican reserves of oil and natural gas. While there is still a great deal of uncertainty as to the amount of these reserves which would be available for use in the United States, Mexico appears willing to negotiate with us. Moreover, the Department of Energy appears to consider Mexican imports in a somewhat different light than it does imports from other foreign countries. Finally, an important point overlooked in the discussions of the natural gas production trends is the recent increase in availability of natural gas due to the deregulation of prices resulting from the new National Energy Act.

The Statement's discussion of potential energy from hydroelectric power and geothermal reserves is even more scanty than that of oil and natural gas. The Statement acknowledges the possibilities for expanding electrical capacity at existing dams to increase hydroelectric production, but gives no estimate of the potential. In light of the fact that this option represents a potential capacity of 47,000 megawatts nationwide,[16/] for which

[16/] Blueprint for a Solar America, Solar Lobby, January 1979, p. 25.

the equivalent coal-fired capacity would require the mining of 140 million tons of coal per year, we believe the Department of Interior should have considered this alternative more seriously. The Department's analysis of geothermal applications is likewise deficient. No mention is made of the California geothermal potential of over 19,000 megawatts.[17] The estimate of the contribution which could be made by solar energy is also unduly pessimistic. The Statement cites forecasts which "suggest that as much as ten percent of U.S. energy needs could be met by solar sources" during the period between the year 2000 and 2020. (p.2-23) Other forecasts have estimated that as much as 20-25 percent of the nation's energy needs could be met by solar energy by the year 2000.[18]

As the Department of Interior acknowledges, an important means for addressing the problem of growing energy demands is to curb those demands by greater use of energy conservation measures. (p. 2-24.) The Statement's discussion of energy conservation, however, indicates that the Department does not consider energy conservation to be a serious alternative to substantially increased coal utilization. After listing a variety of conservation measures, it is stated that,

> "The various conservation measures could have a substantial impact on energy consumption, reducing it perhaps as much as ten percent by 1990 if there are major technology advances." (p. 2-24.)

17/ California Energy Commission, Status of Alternative Technologies, January 1977, p. 35.

18/ Council on Environmental Quality, Solar Energy Progress and Promise, April 1978, p. 5; Solar Lobby, op. cit., p. 2.

No analysis is provided, however, as to which measures would have to be undertaken in order to achieve such a reduction. While the Department admits that, "in many cases, conservation measures might well be more cost-effective than development of new energy sources," (p. 2-24) it has not made a serious attempt to quantify the potential demand reduction which could be achieved by cost-effective energy conservation measures, nor of the specific impact on future demand for coal that the implementation of such measures would have. In light of the fact that the low coal demand projections do not appear to contain a conservation component, the lack of serious consideration of conservation as an alternative energy source is of particular concern.

5. The draft statement does not consider the impact of the preferred program upon demand for coal.

By accepting the demand projections prepared by DOE as a given, the Department of Interior has over looked the issue of the effect of the preferred program on overall demand for energy and, more specifically, demand for coal. In particular, analysis is needed of the impact of the preferred program on average coal price. This evaluation can then be used to determine the relative demand impacts of private versus federal coal development.

The Department has also brushed aside the potential problems which would be created by over-leasing with the following statement:

> "Should demand be significantly lower than was projected, diligent development regulations would assure that leases not put into production are returned to federal ownership." (p. 2-52.)

This assertion reflects again the Department's refusal to admit the role of the preferred program in effecting the overall supply and demand picture. Rather than lose their leases due to the failure to meet diligence requirements, some companies may continue to produce at levels greater than that needed to meet coal demand, raising supply above demand and thus reducing prices. The long-run effect of such activity would be to increase demand or to shift demand from East to West. Such an effect is not necessarily desirable nor is it necessarily consistent with national energy policy.

Generally it is troubling that the DES fails to analyze the interaction between other energy sources and the alternative leasing policies available to the Department. The decision whether, where, when, how and how much to lease will have a substantial impact on the use and development of other energy sources.

6. The Department of Interior errs in accepting the DOE assumption that the majority of coal production will be surface mined.

Because the Department of Energy coal projection model operates on a least cost criterion, and because surface mining operations generally are less expensive than deep mines, the DOE conclusion that the majority of coal production would be surface mined is somewhat of a tautology. The DOE model, however, gives little consideration to the cost of reclamation of strip mined lands, which will be considerable in many cases. The Department of Interior should therefore reassess its assumption that the majority of western coal will be surface mined. (p. 2-25.) Accepting DOE's assumption, the Department of Interior concludes that:

> "because western mining is expected to be almost entirely surface mining except in the Uinta-southwestern coal region, underground PRLA reserves are likely to make an insignificant contribution to reaching 1990 production projections other than in this region." (p. 2-44.)

Thus, the Department has arbitrarily excluded nearly 150 million tons of annual production potential from consideration as an alternative to meet coal requirements. This figure includes nearly 144 million tons which could be deep mined in the Powder River region. (p. 2-36.)

7. The Department of Interior's claim that it is not basing its assessment of the need for new coal leasing on the DOE production projections is not credible.

The Department maintains that

> "... the need to operate a federal coal management program does not rest on the current assessment (i.e., the DOE projections) of future coal supply and demand... sound long-run government policy must acknowledge this uncertainty and not assume that today's forecasts must inflexibly govern resource production decisions of the future." (p. 2-52.)

The implication is that, even if it is proven that the DOE projections are invalid, the preferred program is needed in order to provide for the uncertainties inherent in the forecasting process. The merits of this argument are discussed elsewhere in these comments. The issue at hand is the extent to which the Department of Interior is relying upon the DOE projections in support of its contention that the preferred program is needed. The indications are that the Department of Interior takes the DOE projections seriously. If such is not the case, why have the projections been discussed at such length in the draft statement? Moreover, DOE indicated in the study it performed at the request of DOI that

> "these forecasts are to be an integral part of the Department of the Interior's comprehensive review and redirection of the federal coal leasing program." 19/

19/ DOE, op. cit., p. 1.

Thus, it would appear that the Department of Interior considers the DOE projection an important argument for the need for a new leasing program.

Of greater concern is the fact that these projections appear to provide the rationale for instituting a leasing program as soon as possible, despite DOE's assertion that new federal leasing is not a necessity. The Department of Energy also pointed out in its study that there is presently a great deal of uncertainty in the variables affecting the coal market; at the same time, DOE expects that much of this uncertainty will be resolved in the next few years:

> "The wide range of values reflects the substantial uncertainty surrounding numerous variables affecting the coal market. This spread should be narrowed considerably in the next several years, allowing an appropriate Federal response through leasing policy."20/

We therefore recommend that the Department of Interior delay establishment of a program for immediate resumption of additional Federal leasing until such time as it has resolved some of the uncertainties in demand raised above and given serious consideration to other energy supply options as an alternative to additional coal development.

20/ Id., Executive Summary, p. 10.

B. The DES Fails to Contain an Adequate Explanation of the Proposed Program for Management of Future Federal Coal Leasing.

In finding the final coal programmatic EIS inadequate, the District Court in NRDC v. Hughes stated that it failed to contain a "detailed" explanation of the then-preferred management program EMARS II, and noted that this failure prevented informed public comment. 437 F.Supp. at 990. Although EMARS II is no longer the preferred alternative, it is clear that this programmatic EIS must contain a detailed, comprehensive description of the program the Department proposes to adopt, if the Secretary determines to lease additional Federal coal. The DES purports to present a "detailed description" of the major components of this program, p. 3-14, -- i.e., those components which will ensure that the adverse socio-economic and environmental impacts of the development of western coal are mitigated to acceptable levels. See, e.g., p. 6-2. These components include: (1) the land use planning process; (2) the lands unsuitability criteria; (3) the ranking process; (4) the procedure for setting regional production goals; (5) the NEPA process; and (6) the start-up procedures to be used for leasing in the near term.

The description in the body of the DES provides no details at all with regard to the six component processes which constitute the preferred alternative. To find more explicit information, one must look to the sample regulations in Appendix A of the DES, the proposed Bureau of Land Management planning regulations, 43 Fed. Reg. 58764 (Dec. 15, 1978), the announcement

of the application of the Lands Unsuitable Criteria and revision of existing Management Framework plans, 43 Fed. Reg. 57662 (Dec. 8, 1978); 44 Fed. Reg. 2201 (Jan. 10, 1979), and the many option papers prepared by Departmental task forces. Even searching all those sources only suggests approaches which the Department has considered. How the separate procedures interrelate is often ambiguous. The role of the states, the public and other federal agencies remains unclear. The standards for resolution of crucial issues are either unstated or unrestrictedly general.

Of course it is inevitable that a Draft Programmatic Impact Statement must examine policies and processes which have not been put in final form. But it is crucial that the description of the proposed action (and alternatives) be accessible and sufficiently explicit to permit analysis. As we discuss in the following paragraphs, we do not believe the DES meets that standard.

Land use planning constitutes the basic component of the proposed management program. According to the DES, the BLM's planning system is to provide the "initiative and the forum for the making of the principal decisions in the federal coal management program." (p. 3-18) In particular, the planning process is supposed to identify "areas acceptable for further consideration for coal leasing" as well as the "area-wide constraints and multiple use coordination [requirements necessary] to guide coal program activities." (p. 3-18) It is also supposed to serve as a major vehicle for public participation. However, as the draft statement acknowledges, the Bureau's planning regulations are currently undergoing revision. On December 15, 1978, the Bureau published draft planning regulations which differ significantly from its existing land use planning system, Department of Interior, BLM, "Proposed Rulemaking," 43 Fed. Reg. 58764 et seq., as well as from prior draft planning regulations prepared by the agency. The comment period on the draft regulations does not end until April 1, 1979. No date has been publicly set for their promulgation in final form. The degree to which the final regulations will or will not resemble the proposed regulations is unknown, as is the degree to which the final procedures will enable the agency to make "balanced judgments" about resource uses, (p. 6-2), and guide the development of subsequent activity plans. In their current form, these draft regulations do not fulfill these objectives or the requirements of FLPMA. Thus, while we believe that the Bureau's existing

planning process is fundamentally inadequate, we also believe that the proposed planning regulations must be drastically revised if they are to ensure environmentally sound management of publicly owned lands and resources. See pp. 80-85 infra.

According to the DES, the "public would have an opportunity to comment on the lands identified as acceptable for consideration for leasing, and participate in the resources trade-off decision." (p. 6-2) The degree, quality, and effectiveness of such participation will depend on the planning process which has yet to be established.

As far as future coal leasing is concerned, the lands unsuitability criteria constitute the major addition to the land use planning process. The application of these criteria is supposed to resolve resource conflicts and ensure that future leasing takes place in "environmentally acceptable" areas. (p. 3-20) The lands unsuitability criteria were published in "interim" form on December 8, 1978. 43 Fed. Reg. 57662. Apparently, they will not be published in formal form until after the Secretary decides whether "to adopt a new coal management program in June 1979. ..." (p. A-1) Although the draft statement asserts that "unsuitability criteria would, in some form, be applied to all new leases" as well as existing non-producing leases and preference right lease applications, (p. 3-20) (emphasis added), the degree to which the final version of these criteria will resemble the version discussed in the draft statement is unclear. They have already been redrafted at least once. It is clear that the criteria in their present form will not permit the "consistent, uniform" identification of lands which are unsuitable for coal leasing. Id. See pp. 80-85

infra. We believe that they, as well as the planning regulations, must be drastically revised, if the Department's intentions in promulgating them are to be realized.

The ranking process, "another new and major mitigation element" of the proposed program, (p. 6-2), is supposed to ensure that the tracts leased are "optimum" tracts for coal development. (p. 3-23). According to the DES,

> "because of the probability that, in many regions, there will be more Federal coal that could be leased than would be necessary to lease, the Department has a responsibility to select, from among these coal lands which are not excluded from leasing through application of unsuitability standards or other resource management decisions, those tracts whose development would cause the least environmental, social, and economic damage." (p. 6-2)

This process too has yet to be fully formulated by the Department. According to the draft, in the ranking process, criteria relating to a number of factors including, for example, "coal economics, ease of reclamation, ..., and socio-economic and other environmental concerns would be employed." (p. 3-22) However, the draft does not reveal how these factors will be weighed or utilized in ranking the areas identified during planning as suitable for leasing. It does acknowledge that "standardized procedures [are needed for] judging the relative attractiveness of potential lease tracts." (p. 3-43) Such procedures have not yet been developed, although the DES states that a study "will" be conducted to develop them. Id. Until they are supplied, it is impossibile to assess the degree to which the use of this process will achieve the Department's important objects.

The descriptions of the remaining key elements of the preferred program, the procedure for setting regional production goals and the NEPA process, are unclear and unsatisfactory. According to the DES, the procedure for setting regional production goals is supposed to ensure that the need for coal leasing is continually reassessed. (p. 6-3.) Under the preferred program, the total amount of Federal coal needed will be determined in the first instance by subtracting the expected production of non-federal coal from the national coal production target set by DOE. According to the DES,

> "the Department would review , and if necessary, adjust the total, disaggregating it into the eight regions containing federal coal. This review, adjustment, and disaggregation process would take into consideration statutory policies and land management requirements, the analyses in the federal coal management programmatic environmental impact statement, and subsequent post-programmatic statements ...; industry surveys; and information developed by other institutions and organizations." (p. 3-23.)

However, neither the so-called "detailed" description of this procedure, nor the example regulations, give any indication of how these factors will be weighted in deciding how much Federal coal, if any, should be leased and where such leasing will take place. In the absence of such information, it is impossible to judge the effectiveness of the process as an accurate method of assessing the need for Federal coal and of allocating such needs on a regional basis.

Until the precise procedures and standards for setting regional production targets are defined, it is impossible to judge whether they will give adequate weight to the environmental or socio-economic impacts of proposed leasing in setting regional targets.

Although the DES purports to explain the relationship of this impact statement to subsequent EIS's which will be prepared in connection with future federal coal leases, its explanation is unclear and confusing. The DES indicates that its interregional analysis will be updated, p. 3-23, and that supplements to it may be prepared, p. 6-3. However, the draft does not indicate what proceudres will be followed in preparing these updates or supplements. Nor does it identify the specific circumstances which will trigger their preparation. In particular, the draft does not reveal whether the supplements will be prepared pursuant to formal NEPA regulatiosn or whether any additional programmatic statements will ever be prepared. The example regulations do not appear to recognize that any supplements will be prepared. Moreover, although the text indicates that regional EIS's will be prepared in connection with proposed lease sales schedules (see, e.g., p. 3-23), the example regulations refer only to draft and final environmental assessments (p. A-14).

Finally, only a single paragraph of the DES describes the so-called "start-up Special Considerations" (p. 3-28). Yet, as we discuss elsewhere in these comments, there is evidence that during the coming decade, for the major coal areas of the West, the start-up considerations will be, in fact already are

the leasing program. The preferred alternative will have little significance if major new leasing developments have been begun under an interim program.

In sum, it is apparent that this draft impact statement, like the previous draft and final programmatic impact statements, fails to contain a "detailed" explanation of the proposed preferred management program. While the number of pages devoted to explaining this program undoubtedly exceeds the number of such pages contained in either of its predecessors, it does not present a comprehensible and comprehensive picture of the manner in which coal leasing decisions will be made. Thus it effectively prevents readers from making an informed judgment regarding the degree to which this program will achieve the Department's expressed goals.

C. THE DRAFT ENVIRONMENTAL STATEMENT DOES NOT ASSESS ACCURATELY THE FULL ENVIRONMENTAL IMPACTS OF THE PREFERRED PROGRAM OR ITS ALTERNATIVES.

1. The Department mistakenly concludes that the impacts of the preferred program will be little greater than those of the no-project alternative.

As we have discussed above, a major flaw in the Draft Environmental Statement is its failure to examine realistic alternatives to the preferred program. The alternatives examined in the DES, not leasing, emergency leasing or leasing to meet industry, state or DOE requirements, are not independent coal management programs. They are ways of answering one of the questions which a coal management program must answer: how much to lease. The most significant alternative which the Department failed to consider is a program whereby new leasing is deferred until such time as it is clearly needed to meet future energy requirements, and whereby existing leases are managed in such a way as to balance environmental and economic concerns. It is likely that the environmental impacts of such a program would be quite different from those of continuation of the status quo, termed by the Statement as the no-project alternative.

Because there are a variety of no-project alternatives which would have lesser environmental impacts than the "no new leasing" alternative discussed in the statement, the Department's comparison of the environmental impacts of the preferred program with those of the no new leasing alternative gives the misleading impression that the impacts of the preferred program will be only marginally greater than those of a program which is explicitly designed to ensure full protection of environmental values in the development of Federal coal. We therefore believe the Department states erroneously that,

> "the impacts attributable to the Federal coal management program would be only a small fraction of those resulting from meeting national coal requirements." (5-9)

For example, the Department's assertion that the preferred program will not result in significantly greater environmental impacts than a no new leasing alternative is contradicted by its own projections of the relative regional water impacts of the two main alternatives. The Statement's comparison of the water consumption (evaporation) impacts of the various program alternatives shows that, while the total water consumption for the preferred program will be almost identical to that of the no new leasing alternative in 1985, the preferred alternative will result in more water losses from western rivers. (p. 4-59) Because of lower average streamflows, greater streamflow variation, and over-commitments to other uses, the ecosystems of western rivers will be less tolerant of water loss than would be those in the East. Thus, in the case of water, the preferred program is likely to have significantly greater impacts than the no new leasing alternative.

2. The draft statement does not provide an accurate, thorough analysis of the environmental impacts of the preferred program.

a. The Statement is overly optimistic about the ability to reclaim mined lands, and thus underestimates the land use, soils and water impacts of coal development in general and the preferred program in specific. In our comments on the Draft Environmental Statement prepared by the Bureau of Land Management in 1974, we raised a number of questions regarding the Bureau's assumptions about reclamation potential of the arid, western lands to be mined under the proposed

Federal coal leasing program. While the instant draft statement addresses some of these concerns, it does not provide an objective assessment of the extent to which reclamation attempts will be able to mitigate the impacts of strip mining of western lands.

A major problem with the Department's approach to this issue is that it fails to define the term reclamation. Instead, it relies upon the standards set in SMCRA and other laws, assuming that those standards will assure complete reclamation. Since there is controversy over both the definition of reclamation and over whether various levels of reclamation can be achieved, the Department should state more clearly its assumptions in this regard. Instead, the Department has neatly sidestepped this critical issue by assuming in its assessment of the environmental impacts of the proposed program that only those lands which can be reclaimed will be mined (p. 3-13) and that all mined lands will be successfully reclaimed (p. 5-17). In light of past reclamation failures and the uncertainties associated with future reclamation attempts, we question the validity of these assumptions. Furthermore, we believe the lack of discussion of these problems is a major inadequacy of the statement.

Given the Department's optimistic assessment of the reclamation potential of the lands which will be disturbed by its proposed program, we conclude that it is relying upon a fairly broad definition of reclamation. We believe that the Department must be committed to ensuring that full reclamation of Federal coal lands is achieved, meaning the return of a

site to a state which approximates its original conditions closely enough that it can support vegetation compatible with the climate and develop soils over periods of time beyond which it is managed by man. As we discuss below, there is considerable uncertainty as to whether such a goal can be achieved on western lands.

Most studies on reclamation of strip mined lands in the west indicate that the success of reclamation is dependent upon many site-specific factors, and that much more research needs to be completed before reclamation potential is known.[21/] For example, the recent report of the National Coal Policy Project found that,

> "On the Northern Plains, the goal should be to restore native grasslands to a viable condition, as self-regenerating ecosystems which are able to withstand future droughts (this should be done without reliance on continuing fertilization). No one yet, though, knows whether it will be possible to attain this goal."[22/] (emphasis added)

The Draft Environmental Statement must therefore emphasize the uncertainties in the optimistic assertions it makes regarding reclamation potential.

The statement is also less than informative on the subject of past reclamation attempts. For example, it does not describe the unsuccessful reclamation efforts in the Four

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21/ Rehabilitation Potential of Western Lands, National Academy of Sciences, Ballinger Publishing Co., Cambridge, Mass., 1974.

22/ Where We Agree, National Coal Policy Project, 1978, p. 13.

Corners region.[23/] Furthermore, the statement fails to indicate the extent to which its conclusion that reclamation will be successful rests upon future management with sustained inputs of water and fertilizer.

While such practices may result in fine-looking stands of vegetation, the "reclamation" may not be sustained if the treatments are ended. The use of fertilizers and water for irrigation may in turn cause unpredictable environmental impacts, a possibility which is ignored by the statement.[24/] We believe that, even if sustained management is assumed, successful reclamation of western lands is not the certainty implied in the statement.

Another factor in the Department's overly optimistic conclusions regarding the reclamation potential of western lands is that it incorrectly assesses the land impacts of coal mining by assuming a direct correlation between an arbitrary scale of reclamation potential and estimatos of reclamation time. (p. 5-17) There is insufficient explanation of how the

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23/ National Academy of Sciences, op. cit.

24/ In relation to the use of fertilizer, it is important to realize that the value of soil amendments is widely variable. Some treatments, for example, will increase the yield of plant production, but decrease the nutritional value. Since an animal will eat only a limited quantity, the net result may be negative.

If irrigation is required for successful reclamation, it will involve tremendous withdrawals of water from western streams, the environmental effects of which are discussed in another context infra.

Another potential problem is the synergistic effect on soils of fertilizers and irrigation water. Addition of fertilizers and moisture in excess of naturally occuring amounts will change the leaching characteristics and rates, hydrogen ion concentrations, and the development of the soil profile such that the mobility of trace elements such as boron and cadmium can be greatly increased and potentially toxic plants produced.

arbitrary scale was derived and of the basis for the reclamation time estimates. Nor is there any reason to believe that a direct correlation exists between the two scales. Because so little (if any) reclamation has proven successful in most of the coal regions, the "-8 to +8" ratings are relative only to each other, and should not be correlated with any other scale. There is also some question as to whether the reclamation potential scale is based on the same concept of reclamation as that required by SMCRA, which states that land must be restored to

> "... a condition capable of supporting the uses which it was capable of supporting prior to any mining..." (§ 515(b)(2)).

The assumption that the maximum time required for reclamation is fifteen years is not borne out by other studies in this area. For example, it was observed that natural revegetation of abandoned farmland in the Northern Great Plains takes about fifty years.[25/] Similar timescales will be required before stip mined land can be restored to and maintain its natural state without the assistance of man.[26/] Furthermore, the time required for reclamation in the Western Interior, Eastern Interior, and Texas coal regions was determined

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25/ Lang, R. L. "Some Vegetative Change During Natural Succession on Abandoned Farmland in Eastern Wyoming," Thesis, University of Wyoming, Laramie, 1974.

26/ Curry, Robert R., "Practices and Problems of Land Raclamation in Western North America," to be publsihed in Energy and the Fate of Ecosystems, a report by the Ecosystem Impacts Resource Group of the Risk/Impact Panel of CONAES, National Academy of Sciences/National Research Council, forthcoming.

on the basis of only three personal communications. (p. 5-17) Because reclamation in most areas has not been demonstrated, reliance on such limited authority is irresponsible.

The scale used to assess the relative reclamation potential of coal regions is further inadequate because it cannot reflect the wide variety of lands overlying coal in the United States. In the Fort Union and Powder River Regions alone, for example, there are seven precipitation zones, seventeen soil associations, and nine broad vegetative types.[27/] Another problem with the scale is that it is partially based on mean precipitation, (p. 5-17) when the critical factor is rainfall variation. Most of the western coal land is subject to frequent drought years, which are critical periods for reclamation. Assessment of reclamation potential should therefore consider the effects of the drought years.

Finally, the statement attempts to give a single estimate for reclamation potential in each coal region. (Table 5-8) For comparative purposes an attempt must be made to aggregate the large amount of data, but the statement should also attempt to define those lands where reclamation does not seem possible. The use of a single estimate carries the implicit assumption that reclamation will be successful for all mined land. As discussed above, we challenge the validity of this assumption. In light of the past history of reclamation efforts

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27/ Effects of Coal Development in the Northern Great Plains, Northern Great Plains Resource Program, Denver, Colorado, April, 1975, p. 52.

and the uncertainties regarding true reclamation potential, the Department must give some indication of the way in which the reclamation it states will occur can be achieved.

b. The statement's evaluation of the extent to which the preferred program will result in land disturbance is inaccurate. In estimating land disturbance, the statement claims to use a figure that includes land committed to mining and conversion, although an adequate description of the derivation of this figure is not given. (pp. 5-17 and H-26) Estimation of other quantities of land was considered beyond the scope of the document due to site-specific factors. (p. 5-17) Since

> "[p]rospective environmental impacts of economic development and population growth stimulated by the conversion of energy from strippable coal in the West are likely to far exceed the impact of surface mining alone,"[28]

some estimate of the amounts of land which would be disturbed by roads, pipelines, and residential and commercial structures should be made. It is possible to identify a range of estimates within which the probable amount of land needed for these developments would occur, given a specific level of coal-related development. One could then bracket a subset of the range of estimates for each region based on factors such as estimated population increase, average amount of land required for a residence, and a ratio of commercial to residential acreage.

28/ National Academy of Sciences, op. cit., p. 107.

Some characteristics of the data presented concerning land disturbance are not clearly explained. Table 5-5 indicates that, for the low and high coal development scenarios, the preferred program would lead to more acres being disturbed than the "no new leasing" alternative, but would lead to less for the medium level of coal development. (p. 5-18) It is not clear what factors are responsible for such conclusions.

c. The Statement provides a misleading assessment of the preferred program's impact upon topology and soils. There is insufficient discussion of the unavoidable destruction of topographic and geologic features that would inevitably result from coal mining activities in certain areas. (pp. 5-24, 25) For example, in the Northern Great Plains, the badlands, the floodplains and adjoining breaks, and much of the ponderosa ecosystem have topographic and geologic characteristics that preclude restoration to pre-mining conditions.[29] The "microrelief features" (p. 5-24) mentioned in the statement are unique features of topography in many of these areas and are often essential to the existence of particular biota in the coal regions (an example would be the dependence of ponderosa pine and other conifers upon outcrops of the sandstone, shale and clinker in the Powder River Basin).[30]

29/ Effects of Coal Development in the Northern Great Plains, op. cit, at IV-12.

30/ Draft Environmental Impact Statement of Eastern Powder River Coal Basin, Volume I, Department of Interior, 31 May 1974, Cheyenne, Wyoming, p. I-276.

In discussing the effects of overburden bulking, (p. 5-24) the statement does not assess the consequences of the long-term effects of bulking on drainage patterns and other topographic features. It also does not assess the consequences of lowered topography in areas such as the Powder River Basin, where the overburden to coal ratio is less than the bulking percentage. Thus the claim that

> "... backfilling and grading of the overburden could restore the approximate original contour of the land...," (p. 5-24)

is misleading at best.

The discussion of soil disruption in the statement is superficial; it does not address many of the factors involved and does not assess the consequences of the impacts. Soil disruption affects soil moisture relations, infiltration rates, water holding capacity, bearing capacity, soil structure, soil texture, chemical composition, and soil fertility. The end result of disruption by mining is the formation of new soils with characteristics different from those of the original soils. Topsoil segregation reduces but does not eliminate these effects. The example of the wide variability of soil types that is presented in the statement (p. 5-26) also indicates the high degree of difficulty that would be encountered when attempting to restore the soil to conditions that are similar to pre-mining conditions.

The statement recognizes that soil loss will occur even with measures to minimize erosion:

> "The Surface Mining and Control Reclamation Act contains several provisions designed to control and minimize the soil loss. With reclamation, new soils would form over time; however, in some areas of the West, particularly the more arid regions, hundreds of years could be required for natural processes to reestablish fertile soils." (p. 7-1)

This remark emphasizes the long periods of time required for soils to form naturally in arid regions. What the DES does not point out is that even areas where soils are not lost but merely disturbed will require long periods of time for the development of new soils. As stated in the Draft Environmental Statement for the Eagle Butte mine, Campbell County, Wyoming:

> "On the area to be mined, the destruction of all soil horizons and soil characteristics, which have been developed over long periods of geologic time, cannot be avoided. The existing soil biota will be greatly reduced through mixing and burial and, in soil stockpiled areas, essentially terminated. Once mining is completed and the area reclaimed, soil-development processes will need to start all over again on the mixed materials used as topsoil." [31]

Of importance to the reestablishment of soil development is the ability of the soil to sustain vegetation which can withstand the extreme climatic conditions of the arid west. However, the vegetation must be able to survive unaided in order to provide the proper nutrients to result in soil development over geologic time:

31/ Draft Environmental Statement, Proposed Mining and Reclamation Plan Eagle Butte Mine AMAX Coal Company Coal lease W-0313773 Campbell County, Wyoming, U.S. Dept. of the Interior, Geological Survey, October 1976, p. 2.

> "The degree of success in reestablishing such a self-sustaining grassland community on reclaimed coal lands is largely an unknown for the long term."32/

Furthermore:

> "Current experimentation with native species suffers in that insufficient attention has been given to the critical relationship between degree of soil development and degree of survival of native species under conditions of stress. Here use of native seed sources is assumed by many to insure survival of plant cover through drought or other stress periods without understanding how a mosaic of native species is necessary to accomplish this task."33/

Given the factors discussed here, the statement should acknowledge that soil loss is an unavoidable adverse impact for which mitigating measures are still being developed and that there is some doubt as to the ability to recreate conditions which existed prior to mining.

d. The statement does not consider the long-term effects of unsuccessful or partially successful reclamation efforts. By limiting its scope to the period before 1990, the statement ignores the cumulative effects of long-term mining on Federal coal land. Dependence upon coal during the 1980's will create pressure to continue mining that resource in the future. A comprehensive environmental statement must consider the cumulative effects of unsuccessful reclamation efforts, or at least consider the possible effects of continual coal mining activities over a time period that is sufficiently long to ensure steady-state conditions (i.e., the amount of land being successfully reclaimed equals the amount of land being disrupted).

32/ Id., p. V-3.

33/ Curry, op cit., p. 5.

Because the statement assumes a priori that all reclamation will be successful, neither of these alternatives is considered.

e. The Statement's assessment of the water impacts of the preferred program is inadequate due to the use of incorrect assumptions in some cases and to the failure to explain assumptions in others. Because the presentation of the Department's analysis of the program is overly general in a number of respects, it is difficult to determine whether the assessment of impacts is complete.

For example, the estimates of future water consumption are not broken down into uses, making it impossible to compare water usage associated with coal development to water usage for other activities. There is also no description of the assumptions that were used in estimating future water requirements (for example, the annual amount of water used by a standard-size coal gasification plant).

Some of the data indicate extraordinary assumptions: for example consumptive water use decreases in the Denver-Raton coal region between 1976 and 1985, and in the Powder River Coal Region between 1985 and 1990. (Tables E-6 and E-11) Present trends in both of these regions indicate growing water demand. Another inadequacy of the analysis is that estimates of available water in each region are taken from streamflow data of major rivers at the downstream end of each region. (p. 5-57) Using these data as estimates of water availability ignores the problem of water distribution within the region. Examination of this problem in the statement is totally inadequate.

Furthermore, the statement makes no attempt to assess the impacts of major surface water diversions, groundwater withdrawals, and new reservoirs which would be required under the preferred program.

The statement also fails to assess the consequences of the impact of coal mining-related pollutants discharged into streams whose flows have been reduced as a result of coal development. The water flows predicted in some regions during periods of low flow are small, indicating that the impact of chemical and sediment loading on streams is likely to be significant. The statement does discuss surface water shortages during periods of low flow in the Texas, Powder River, Denver-Raton, Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan Coal Regions (pp. 5-33 to 5-47), but again it neglects to discuss the consequences of these shortages or of the impacts of measures taken to avoid them (i.e., the construction of new reservoirs).

Finally, the Department's approach does not provide an adequate comparison of the water impacts of the preferred program with those of the no-project alternative. First, the statement glosses over the difference in regional water impacts resulting from each of these options.

Second, the estimate of the water impacts under the no new leasing alternative, taken from an independent analysis prepared by the Water Resources Council, is likely to contain implicitly at least a portion of the water requirements for future Federal coal development. (p. 5-33)

The Department contends that this approach results in a double-counting of water needs and thus exaggerates the estimate of the impacts. In fact, however, it may be masking the total impact of Federal coal development on western water supplies. In order to determine the latter, it is necessary to know the extent to which the Water Resources Council data assume coal development which would occur only through the opening of new Federal leases.

f. The Statement's discussion of air quality impacts of the preferred program is insufficient. Because the Department assesses air quality impacts within the coal production regions only, the full end use impacts of the program on national air quality are not considered. Since much of the coal will be burned outside the coal production regions, the Department's region by region comparison of total emissions does not provide, as alleged,

> "...a comparison of the emissions associated with the Federal coal management program alternatives against the no new leasing base case." (p. 5-50)

We also question the Statement's proposal that

> "...a comparison of the total emissions for each alternative is the most meaningful measure of relative air quality impact available." (p. 5-50)

Since the impact of a specified level of emissions in some regions would exceed the impact of the same level of emissions in others, the proposal is not necessarily correct. For example, the impact of a strip mine or a coal-fired electric generating plant is more likely to have a noticeable impact on air quality within an air basin in the Northern Great Plains or Four Corners Region than would a mine or plant of the same capacity if it were located in the Eastern Interior or Western Interior Region, because of the differences in ambient air quality of these regions.

g. The statement does not assess the long-run impacts of the environmental stresses which will be caused by the preferred program. The statement acknowledges that the preferred program and any other alternative involving significant amounts of coal development will create serious environmental stresses in the regions where coal is mined. However, it does not attempt to estimate the impacts that these stresses will have on those regions. We believe that an evaluation of the long-run consequences on particular species and ecosystems within each region is also essential to any decision concerning Federal coal leasing policy.

To its credit, the statement does attempt to address the issue of ecological impacts. Unfortunately, the assessment is too superficial to be meaningful; moreover, it relies once again on some questionable assumptions. For example, the statement estimates plant and wildlife losses by multiplying plant and wildlife densities by the estimated number of acres directly disturbed by coal development. (p. H-26) As discussed

earlier, the estimates of total land disturbance are subject to challenge. In addition, this method of calculating plant and wildlife loss neglects the fact that certain habitat zones support wildlife from a much larger area. For example, bottomlands cover only four percent of the land surface in the Northern Great Plains, but they provide water and winter forage for wildlife that range over a much larger area.[34/] Habitat characteristics vary within each coal region and in some cases the wildlife within different habitats are interdependent, so the loss of one type of habitat could upset the balance in another.

The statement also fails to deal adequately with the ecological impact of increased human population and easier access to previously undisturbed areas in the coal regions. The increased population resulting from coal development would exacerbate impacts due to hunting, fishing, off-road vehicles use, and other human outdoor activities. New roads and rights-of-way for pipelines, transmission lines, and aqueducts could open remote areas by providing a pathway for penetration into the areas, possibly disrupting fragile environments and faunal migration patterns. The most significant effect of increased human activity may be that it could drive certain species out of large areas, reducing their habitat by a much larger area than is represented by the estimates given in the statement.

34/ Effects of Coal Development in the Northern Great Plains, Northern Great Plains Resource Program, Denver, Colorado, April 1975, pp. IV-5, 6.

Furthermore, the statement completely ignores long-term and cumulative ecological effects: no consideration is given to impacts after 1990. (p. S-3) Although it is difficult to assess long-term ecological effects of specific stresses, some comments can be made regarding potential consequences of coal development. For example, strip mining thick beds with shallow overburden can significantly alter drainage and erosional patterns. Mining can alter the quality and quantity of both surface and ground water, alter soil characteristics, and change the topography and geology of the land. Soils in arid and semi-arid climates recover very slowly, so loss of productivity could be a significant factor.[35/] While the statement assumes a return to original productivity, alteration of the environment may prevent it.

Thus, the numerous environmental changes associated with coal development could diminish the ability of an ecological system to reestablish itself. If reestablishment is not attained after some period of time, then the fragile, low-density food webs of most western coal regions become very susceptible to disruption. As can be seen from the statement's list of endangered species in the western coal regions, (pp. S-77 to S-80) flora and fauna in these areas are already stressed; additional burdens caused by coal development may make extinction a real possibility.

35/ Final Environmental Impact Statement, Alternative Fuels Demonstration Program, U. S. Energy Research and Development Administration, ERDA-1547, v. 1, Washington, D. C., September 1977, p. V-15.

In short, the statement's discussion of the environmental impacts of the proposed program does not fully assess the consequences of Federal coal leasing to the natural ecosystems of each region. In order to provide an adequate analysis of the total environmental impact of the proposed program, the statement must relate its estimates of the "loading" upon the environment to the long-run ecological consequences of such disturbance.

IV. THE INADEQUACIES OF THE DEPARTMENT'S PROPOSED COAL MANAGEMENT PROGRAM

A. The Statutory Framework

Recent statutes clearly impose upon the Department of the Interior the obligation to develop and implement a sound management policy for all publicly owned resources and lands and to conduct any leasing of federally owned coal pursuant thereto. In addition, the Department is now required to assure meaningful public participation in the development of the land use planning process as a whole, as well as in the development and revision of individual land use plans.

FLPMA. In enacting FLPMA, Congress established fundamental policies for the management of federal lands and resources and provided specific authority for their implementation. Management policies established by the Act include environmental protection, § 101(a)(8), multiple use management pursuant to land use planning, § 101(a)(7), public participation, § 102(a)(5), and the establishment of comprehensive rules and regulations to provide, inter alia, for "objective review of initial decisions and expeditious decision making." § 102(a)(5).

The Secretary has been given full authority to implement these policies: Section 103(c) incorporates environmental protection in the definition of multiple use and § 302(a) directs the Secretary of the Interior to manage the public lands pursuant to principles of multiple use and sustained yield in accordance with land use plans. Section 202(a) provides that land use plans are

to be developed, maintained, and when appropriate, revised, with public involvement. Utilization of an interdisciplinary approach in planning is mandated. § 202(c). The Secretary is directed to promulgate rules and regulations for management of the public lands, § 310, and the public is guaranteed the opportunity to participate in "rulemaking [and] decision making" as well as planning. § 103(d). In particular, the public is to be given the opportunity to "comment upon the formulation of standards and criteria, for, and to participate in, the preparation and execution of plans and program for, and the management of, the public lands," § 309(e).

FCLAA. FCLAA requires the Secretary to obtain fair market value for all coal leased by him and forbids the leasing of coal unless "the lands containing the coal deposits have been included in a comprehensive land use plan and such sale is compatible with such plan," except in limited circumstances. § 3(a)(i).

SMCRA. SMCRA sets minimum environmental standards for surface coal mining operations, § 515, requires the promulgation of a Federal Lands program, § 523, and mandates procedures for determining whether lands are suitable for surface mining, § 522. SMCRA is intended in part to "protect society and the environment from the adverse effects of surface coal mining opeartions" and to "assure that surface mining operations are not conducted where reclamation . . . is not feasible . . .." § 102(a)and (c).

B. The Proposed Program

To its credit, the Department of the Interior has attempted to integrate the various overlapping and related requirements of these statutes and to establish a framework for land use decision-making in general and coal decision-making in particular. The Department's "preferred alternative" has as its goal the integration of coal management with land use planning. (p. 2-52.) It not only establishes some opportunities for public participation, it also recognizes the need for a coal management policy. Moreover, it distinguishes between the need for such policy and the need for future leasing. Finally, it provides for an ongoing assessment of the need for future leasing.

Despite the incorporation of these and several other highly desirable features, however, the preferred alternative suffers from two critical problems. First, as indicated above, in order to permit leasing by mid-1980, a completely different process is being used to plan for leas sales in areas including major coal resources. As the result of these rapid schedule, the development of a cohernet planning policy is being by-passed or distorted. Second, in developing its preferred program, the Department has failed to include clear and specific standards and criteria which are needed to guide decision-making at all levels as well as to guide public participation in the decision-making process. Unless remedied, these critical problems will fundamentally impede the realization of the Department's paramount objective -- that "all future leasing must not only conform to, but

be a product of, a planning and regulatory process designed to be protective of the environment and of other resources and interests." (p. 2-51.)

As indicated, we fully support the Department's decision to utilize land use planning as the basic component of the federal coal management program. Indeed, we believe this decision is required by law. Clearly, the success of this approach as the means of determining whether it is in the public interest to lease and mine specific coal deposits depends on the quality, soundness, and adequacy of the land use planning process in general and of the resulting land use plans in particular. Based on our experience with the BLM's existing planning process, we believe that changes in it are urgently needed "to substantially improve the quality of land use plans" (p. 3-18), to respond to the mandates of FLPMA, and to enable the Bureau to meet the ever-increasing demands being made upon the public lands and their resources. Unfortunately, the changes in the planning process which the BLM recently proposed, 43 Fed. Reg. 58764 et seq. (December 15, 1978), fall far short of complying with FLPMA and of creating the kind of planning system to which the making of land use decisions can confidently be assigned.

1. The Existing Planning System Fails to Provide an Adequate Basis for Decision-making.

In our view, the major defects of the existing planning system include the following:

1. It does not provide sufficient guidance to local managers for use in making land use decisions. See, e.g., Department of the Interior, Coal Task Force 2, Final Report/Land Unsuitability Criteria, pp. 30-31 (Sept. 11, 1978);[36]

2. It does not resolve conflicts between resource uses, despite the fact that this is one of its fundamental objectives;

3. It is not based on adequate information regarding the resources, existing resource conditions, and capabilities of the lands involved;

4. It does not incorporate environmental considerations as an integral part of the planning process American Society of Planning Officials, Improving the Bureau of Land Management's Planning Process, p. 13 (May, 1978) (hereinafter "ASPO Report");

5. It does not ensure meaningful public participation; ASPO Report, p. 12;

6. It is not responsive to current legislative directives. See, e.g., DES, p. 5-155; Department of the Interior, Bureau of Land Management "Statement of Policy", 43 Fed. Reg. 57662 (Dec. 8, 1978); ASPO Report passim; and

7. Land use plans or management framework plans ("MFPs") as they are now called,do not guide the development of subsequent resource or activity plans, although this too is one of the system's major objectives.

[36] As a result of the broad discretion given to the field decisions embodied in land use plans are inconsistent within districts as well as between states. Additionally, as the result of such discretion, different decision making processes are followed within districts, between districts, and between states.

In sum, the Bureau of Land Management's existing planning system does not make "balanced judgments about resource use" (p. 6-2), and its products are not "comprehensive multiple use land use plans." (p. 3-18.)[37] Nor are they "complete, accurate, and environmentally sensitive." 43 Fed. Reg. 57662. Moreover, some of the existing approved MFPs are "plans" in name only and do not even comply with the requirements of the current planning system. Although the Department has acknowledged the inadequacies of existing MFP's, it nonetheless has determined to "supplement" nine(?) existing plans, Id., involving 700,000 acres in five states and to utilize them as the basis for identifying areas which could be leased in 1980. 43 Fed. Reg. 57664. We submit that the deficiencies of these MFPs cannot be cured by this "bandaid" approach, and moreover, that the actions undertaken by the Department to implement this approach violate the Hughes order.

[37] There are, of course, a number of reasons for these fundamental deficiences in the Bureau's existing planning system. For example, it was developed prior to the passage of both NEPA and FLPMA.
In addition, the Bureau does not now prepare environmental impact statements on land use plans. Moreover, the agency does not mandate adherence to the MFP in the development of subsequent activity plans. Finally, it has not promulgated need policy directives.

2. The Proposed Land Use Planning Process Will Not Provide an Adequate Basis for Decision-making.

The draft planning regulations, 43 Fed. Reg. 58764 et seq., purport to establish a comprehensive land use planning system pursuant to which the future management of public lands and resources will take place,[38] as is mandated by FLPMA, §§ 102(a)(5), 202(c)and(f).

The proposed regulations reflect a significant improvement over the existing system in several respects. Notably, they are regulations rather than manual provisions; they require an EIS to be prepared on management framework plans, §1601.0-6; they set forth the planning principles mandated by FLPMA, § 1601.0-8; they specify some opportunities for public participation, see § 1601.3; and they grant at least a limited right of appeal of land use plans and certain land use plan amendments. §§ 1601.6; 1601.6-3(b)(2).[39]

However, although the proposed regulations require adherence to FLPMA's planning principles, they supply no guidance for translating these principles into a comprehensive land use plan that will in fact resolve conflicts, be flexible, and meet all other requirements of law. They do no more than require that unspecified kinds and amounts of information be obtained and considered in planning. They contain no rules that are standards against which decisions and on-the-ground actions can be measured. They contain no rules to ensure that an acceptable level of resource

[38] This discussion of the proposed land use regulations summarizes our major concerns about these regulations as they relate to future federal coal development. It will be supplemented by detailed comments on the draft regulations which we will submit prior to the close of the formal comment period.

[39] These provisions should be revised to allow "any person adversely affected by" any land use plan decision, including all decisions to amend such plans, to appeal. They should also at leastallow appeals to the Secretary at his discretion.

protection would be achieved. Finally, although they indicate that some such rules may be established and that policy directives will be developed at state and national levels, 13 Fed. Reg. 58765, they provide no procedures or deadlines for their establishment. Thus the proposed regulations perpetuate fundamental problems of the existing system, including, in particular, its failure to provide criteria to guide the development of land use plans, decision-making, and public participation. In addition, they fail to provide adequate public particpation opportunities generally. Finally, they completely distort the unqualified mandate of FLPMA to use an interdisciplinary approach in the development and revision of land use plans. § 202(c)(2). As the result, the proposed planning process does not comply with FLPMA and will not adequately fulfill its key role in future resource management.[40]

[40] Comparison of the proposed regulations to the prior draft planning regulations reveals that the Bureau has deliberately and regrettably decided to restrict public involvement; minimize the use of an interdisciplinary approach to planning at all levels of the agency, and increase in the amount of discretion given to state directions and local managers. See generally, Instruction Memorandum No. 78-505, from the Director, BLM, to the Directorate, Washington Office Division Chiefs, and State Directors (September 14, 1978), and the Department of the Interior, Bureau of Land Management, "Discussion Package for Use in Preproposed Rulemaking Phase of Regulation Development for Inventory and Planning Under Sections 201 and 202 of the Federal Land Policy and Management Act (FLPMA) (February 23, 1978).

The extraordinary degree of discretion given field employees is obvious upon even a brief review. For example, although the regulations require that an interdisciplinary approach be used in planning, the determination of this approach is left entirely up to the discretion of district managers. See § 1601.2. Similarly, no standards are supplied for the inventory on which plans are to be based or for monitoring their implementation. §§ 1601.5-3, 1601.5-9. Although the planning process by definition is supposed to make "allocations of resources between uses and/or levels of use," 43 Fed. Reg. at 58766, the draft regulations contain no mention of resource conflicts and no directions for resolving them except through application of the lands unsuitability criteria, the inadequacies of which are discussed below. Given these deficiencies, there can be no assurance that future resource management plans, amendments or revisions will be based on adequate data and reflect the required approach to decision-making.

Where guidance is given by the proposed regulations, it is patently inadequate. For example, the regulations direct district managers to develop "planning criteria" which in turn will be used to determine the contents of each resource management plan, the collection and use of data, and the degree to which each is "tailored to the resources, issues, concerns and opportunities involved." §§ 1601.5-2; 1601.5-7; 1601.5-8. The regulations provide that these criteria are "generally" to be based on a number of factors including laws, policies not yet developed, "public issues," and the planning principles

of FLPMA. § 1601.5-2. However, they give no indication as to how these factors are to be used in preparing the planning criteria. Additionally, the regulations fail to require the evaluation of the planning criteria by anyone other than the District Manager prior to their inclusion in the draft impact statement on the preferred plan and alternatives despite the fact that they are the only tests authorized for selecting the preferred alternative as well as the ultimate resource management plan. §§ 1601.5-7, 1601.5-8. Given the central importance of the planning criteria in the planning process, it is clear that the lack of guidance for their development will have a direct and critical effect on planning quality.

Similarly, the "minimum" guidance provided for the development of resource management plan alternatives is insufficient. This is one of the most important parts of the planning process. The regulations direct that, in addition to a no-action alternative, a plan be developed which "shall be as responsive as possible" to public, governmental and other concerns, as well as "established guidance." § 1601.5-5. They also require that additional alternatives for "portions" of the plan be developed "where reasonable resource management alternatives exist". Id. (Emphasis added.) At best, these directives are meaningless. At worst, they will encourage district

managers to limit their exploration of available, comprehensive alternative management plans and possibilities.[41] In coal areas, in particular, they may well bias local planning toward coal development.

The draft regulations also supply inadequate guidance regarding the use of the resource management plans. First, they fail to require that such plans be binding and that subsequent activity plans be based on and consistent with them. Indeed, the regulations contemplate that actions will be allowed which are neither "specifically provided for in the plan"nor "clearly consistent with" its terms and conditions. § 1601.0-5(c). Consequently, they faile to supply any assurance that future land use plans will in fact determine all future uses of the resources involved and effectively control their management.[42] Cf. DES, pp. 3-18, 6-2. In this regard, it should be noted that the DES also fails to supply this essential assurance. It mentions two possible "constraints" on subsequent coal development -- "preferred area designations" and "threshold development levels." pp. 3-18, 3-21. However, the former are explicitly described as "advisory only," p. 3-18 , while the inclusion of the latter is left to the discretion of the local managers.

41/ The minimum required alternatives appear to be inconsistent with NEPA's objectives as well as the NEPA regulations promulgated recently by the Council on Environmental Quality. See § 1502.4 43 Fed. Reg. 55996 (Nov. 29, 1978).

42/ The ease with which the draft regulations would allow plans to be amended contributes further to this lack of assurance. The regulations define an amendment as a "significant change in the approval [sic]plan." §1601.6-3. They would allow some such changes to be made on the basis of environmental assessments only. §1601.6-3(b)(1). Significant changes in management plans should not be permitted without an EIS.

As indicated, the draft regulations also fail to comply with FLPMA's requirement that "systematic, interdisciplinary approach" be used in the development of land use plans. §202(c)(2). This directive is absolute and unqualified. Compliance with it mandates the utilization of such an approach throughout the planning process. As mentioned above, however, the proposed regulations allow district managers not only to define the meaning of the statutory phrase but also to determine how the approach will be utilized in planning. §1601.2. Moreover, they direct district managers to perform certain functions including the development of planning criteria, the analysis of the management situation and the development of alternatives, §§ 1601.5-2, 1601.5-7, which can -- and should -- be performed by an interdisciplinary team in order "to achieve integrated consideration of physical, biological, economic and other sciences." FLPMA § 202(c)(2). In this regard, it should be noted that the prior draft planning regulations not only established minimum requirements for the composition of interdisciplinary teams but also required such teams to perform these and other functions in the preparation of land use plans, as well as in the development of state-level policies. See Instruction Memorandum No. 78-505, supra, n . ____, §§ 1601.2; 1601.6-2; 1601.6-4; 1601.6-5. Unless the final planning regulations contain such requirements, the ability of the Department to actually integrate all alternative resource uses, including coal development, and make rational trade-offs between them will be seriously hampered.

As stated above, another major defect of the draft regulations is that they fail to provide for adequate and meaningful public participation. FLMPA requires such participation and the Department has asserted that it is a "critical" part of the planning process, 43 Fed. Reg. at 58765, as well as the preferred coal management program. (DES, p. 6-3.) However, the regualtions contain no provision for public participation in the development of "[g]uidance for resource management plans [which] shall be provided by the Director and State Directors." § 1601.1(b). Although the regulations state that public participation "shall be strongly encouraged at the early stages of issue identification and development of planning criteria," § 1601.3(a), such participation at these stages is not required. Indeed, it is only reqiured at a later stage, "upon starting preparation or revision," of land use plans. § 1601.3(c). Although 15 days notice is required for "a meeting of some sort," §1601.3(e), the form of that notice and the kinds of "public participation activities" that will be provided at the different planning stages are left to the discretion of individual district managers. § 1601.3(b). The absence of a formal, prescribed process for public participation will hinder the realization of the Department's goal of ensuring that the public will always be well represented throughout the entire leasing process, including land use planning (DES, p. 6-3). The history of BLM planning and policy formulation has nto been one of openness to public partici-

pation.[43/]

In enacting FLPMA, Congress set forth a number of objectives for future public land management, but did not describe in detail the means by which these objectives were to be reached. Instead, Congress directed that the Secretary of the Interior "shall issue regulations necessary to implement the provisions of this act with respect to the management, use, and protection of the public lands, ..." FLPMA, § 303(a). It is clear from the policy provisions of the Act, 102(a)(5), and specific statutory provisions, see, e.g., § 303(a), that Congress intended

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[43/] The role afforded state and local governments in the proposed planning process contrasts dramatically with that afforded the general public. The regulations contain extensive provisions for "coordination" with such agencies, §1601.4-2, and require "guidance for resource management plans and the plans themselves" to be "as consistent as possible with" official governmental plans and policies. § 1601.4-3(a). FLPMA does contain a so-called "consistency requirement", § 202(c)(a), and it is important for the BLM to maintain good communications with state and local governments. However, the Department cannot allow these agencies to dictate the general policies to be followed in land use planning. The proposed regulations not only fail to make this essential fact clear, but also appear to invite this result.

the resulting regulations to create specific guidelines and standards to be met in planning and decision-making. As demonstrated above, however, the draft planning regulations do not create specific and enforceable regulatory guidelines which will ensure the environmentally sound management of public lands and public resources. Instead, some of the draft provisions defer the establishment of standards to future planning or decision-making. Some create pseudo-standards by requiring action within parameters so ill-defined as to be impossible to implement. Others disregard specific statutory mandates. Finally, the regulations set forth laudable but general goals without elaboration of the means by which they are to be accomplished. We do not believe that the proposed planning regulations establish the basis for fair, consistent and informed resource management decisions. Rather, by vesting local land managers with enormous discretion, they both leave him unprotected from local political pressure and invite him to infuse into planning decisions his own views on policies which should be determined on a national level.

In addition to failing to comply with FLPMA, the proposed regulations are inadequate in several other important respects. First, the proposed regulations authorize BLM state directors to file EIS's on land use pland and eliminate participation by the Office of Environmental Policy Review (OEPR) in their preparation. See Fed. Reg. 58765. In our experience, OEPR has had a major, positive

influence on the quality and contents of EIS's prepared by the BLM. Elimination of OEPR review is totally inappropriate in light of the critical nature of these land use plans as the foundation for all Bureau programs, including, for example, areas of critical environmental concern (ACECs) and wilderness review as well as coal management. In addition, we are concerned about the treatment in the proposed regulations of "situations where action can be taken based on another agency's plan or a land use analysis." § 1601.6-4. Given the extensive acreage throughout the West which potentially may be involved in these situations, we believe that such actions must be carefully considered in order to avoid unwise and indiscriminate environmental impacts. In general, the draft regulations direct that proposed actions be "considered," but provide no standards for determining whether they should be "taken." In the case of coal, they specifically contemplate that actions will be taken based on single use planning, rather than comprehensive planning. Such planning is obviously undesirable and must be allowed only in limited circumstances. The Federal Coal Leasing Amendments Act specifically restricts such planning to circumstances in which coal resources involved "are insufficient to justify the preparation of a federal comprehensive land use plan." FCLAA, § 3(a)(i). The draft regulations, however, fail to include this requirement. Moreover, in cases where another agency has prepared a plan, they fail to require an evaluation of the adequacy of that

plan, §§ 1601.6-4(b)and (d), or the degree to which it is in fact a "comprehensive land use plan." § 1601.6-4(c). In addition, they fail to require that actions based on other agencies' plans must be consistent with Departmental policies.

3. The Land Unsuitability Criteria are inadequate.

A primary requirement of any federal coal leasing program established by the Department of the Interior is that areas to be leased are environmentally acceptable. This principle is contained in President Carter's Environmental Message of May 23, 1977, and is explicitly mandated by both SMCRA and FLPMA. The Lands Unsuitability Criteria ("Criteria") are the major tool in the preferred alternative to assure that this goal is met.44/ DES, pp. 3-4, 5-140. They are an appropriate tool, but as presently structured they are inadequate. We have already stated our view that the Department's decision to utilize the draft Criteria to complete planning activities necessary for a mid-1980 coal lease sale violates both the order of the Court in NRDC v. Hughes and the statutory mandates for the adoption of the Criteria. In addition:

44/ Our review of the unsuitability criteria in the DES has been greatly hindered by the lack of any single discussion of what constitutes the unsuitability criteria. The criteria are listed differently in Table 3-1 in Chapter 3, Table 5-72 in Chapter 5 and Section 3461 of the proposed regulations in Appendix A. The text indicates that these three sets signify an evolution of the criteria based on interagency review and field testing culminating in the draft regulations. The draft regs themselves are only said to be an indication of what final criteria may look like. Yet the criteria are already being applied to hundreds of thousands of acres. The DES should describe the reasons for the modification of the criteria field-tested during the summer of 1978, and for the ongoing application of the new criteria.

1. The Criteria fail to provide explicit standards to govern decisions made under them. The level of support and quality of data necessary for a decision whether a criterion applies is vague.

2. The Criteria omit provisions specifically required by SMCRA.

3. The Criteria include exceptions which exceed the authority of BLM.

The Draft Final Report of the task force which prepared the Criteria acknowledged that, while provisions which allowed local alnd managers broad discretion would permit flexibility, they would also foster inconsistency. The draft Criteria suffer from exactly that vice. There is not indication of what degree of support is necessary for a decision under the Criteria, nor how a local land manager should regard a lack of data. BLM Instruction Memorandum 79-76 suggests that for the present, unless the local land manager is "quite certain that the area would be judged unsuitable," he should treat the area as acceptable at least until the activity planning stage. The DES gives no hint what level of "certainty" will be required for unsuitability determinations under the preferred program. SMCRA requires that the application of unsuitability criteria be based on "competent and scientifically sound data and information," § 522(a)(1). Although the results of the field tests, as described in the Task Force 2 final report, indicated major information gaps in the test areas, the DEIS contains no directive for a completed data base as a prerequisite to applying the criteria. It is essential that minimum data requirements be defined.

Still greater discretion is given local managers by the exceptions to the Criteria. The DES states that "the intent of the exceptions is to give maximum flexibility" at the level of the local land manager (p. 3-20). The language in the President's Environmental Message, the Surface Mining Control and Reclamation Act, and the Federal Land Policy and Management Act do not mandate flexibility, they mandate resource protection. In essence, the exceptions to the criteria would allow land managers to rationalize mining in virtually any area regardless of its non-coal resources and values.

Even when the local manager applies an exception over the objections of another federal or state agency with special expertise, no explicit burden of justification is imposed on him by the Criteria. Many of the Criteria (and exceptions) address resource values, responsibility for which the Congress has lodged in agencies other than BLM. Yet the exceptions do not even require the concurrence of these agencies when applying the Criteria. There is not statutory authority provided to the Bureau of Land Management which allows these resources to be threatened or lost by mining activities, or which allows the Bureau to take over the responsibilities of other agencies. The statutory authority for any exception must be clearly established. If no such authority can be established, the exceptions are illegal and the Criteria subject to challenge.

If a statutory base can be established allowing exceptions for certain Criteria, the Criteria should contain specific standar-s that the land manager must use in applying the exceptions. Such standards are necessary to ensure that exceptions were applied uniformly and not arbitrarily to federal lands.

On page 5-140 of the DES, the description of the unsuitability criteria states that the Secretary would have the discretion to declare lands unsuitable if mining would cause significant damage to "natural systems in fragile or historic lands." However, no criteria are proposed which address natural systems or the cumulative impacts of leasing on systems. Parts of systems, such as floodplains or wetlands, are listed, but the integration or various components of ecosystems is not fully addressed. Major omissions are in the area of water supply, water quality, and air quality, particularly the problem of the visibility requirement of the Clean Air Act and fugitive dust from mining operations. Water supply is mentioned as a general criterion (p. 5-140) but is only addressed in the specific criteria as municipal watersheds. As water supply is perhaps the key to alternative lands uses in the West, it should be treated separately in these Criteria. It is unclear as to why water resource criteria contained in the Task Force reports have been completely eliminated in the DES.

Criteria listed in section 522 of SMCRA are omitted from the draft Criteria. The Criteria as presently drafted do not have the capability to assess whether operations will "affect fragile . . .

lands in which such operations could result in significant damage to important . . . values and natural systems." § 522(a)(3)(B). Sections 522(a)(3)(C) and (D) require that renewable resource lands, particularly aquifers and aquifer recharge areas and natural hazard areas, be declared unsuitable. Although the Task Force 2 report initially included criteria on aquifers and unstable geologic features, they were subsequently deleted from the proposed Criteria. This deletion is unacceptable. Proposed regulations must include criteria covering these subjects if statutory obligations are to be met.

SMCRA declares lands in the National Forests to be unsuitable if other resource values are of greater value than mining. The Criteria address the exception for deep mining in the Custer National Forest but do not address other resource values of National Forests, except in the context of wilderness review (d). We recommend that additional criteria be added which address the other resource values of National Forests as required in Section 522(e)(2).

With regard to the specific provisions of the Criteria as they appear in Appendix A of the DES, we have the following comments.

b. Rights of Way and Easements

The large number of exceptions included with this Criteria essentially negates the Criteria itself. We suggest that any exception require the acceptance of the parties involved in the right of way or easement (iv). This cannot be one of many exceptions. We oppose exception (v) which would allow any activity

to go forward, unless the specific stipulations which would be used are subject to public review. As written, the local manager could allow exception (v) with virtually no guidance on what kind of stipulations would be required.

c. Buffer Areas

Exception (iii) allows an owner to an occupied "building" to permit mining closer than 300 feet. This exception runs counter to the statute which specifically refers to "dwellings."

e. Scenic Areas

The criteria is completely undermined by the exception which allows a discretionary decision by the local manager. We strongly oppose including this exception in the criteria. Again, no standards are provided to guide a land manager's use of an exception. An additional problem with this criteria is the assumption that lands would have been evaluated for their Class I or II status at the time the criteria would be applied. We suggest that the criteria be amended to require that such an analysis be completed prior to subjecting an area to review using this criteria.

f. Scientific Areas

The criteria have gone a step beyond the Surface Mining Control and Reclamation Act which allows areas to be exempt if

mining would significantly damage scientific values, by requiring that areas are being used for scientific study to be declared unsuitable. We suggest that the Department reevaluate the statutory basis for this criterion and appoint a scientific study group to evaluate the scientific potential of proposed areas. We recommend that the exceptions be allowed only if both (i) and (ii) can be met.

g. National Register Sites

We suggest that exception (iB) require the concurrence not simply consultation of the Advisory Council on Historic Preservation. This tracks the language of Section 522(e)(3) of SMCRA.

h. National Natural Landmarks

The exceptions for this criteria essentially negate the purpose of the criteria. Exception (i) is unacceptable if the areas has been designated as a national landmark; exception (ii) contains no guidance as to what constitutes "appropriate mining technology"; and exception (iii) is unacceptable because no standard is provided to make this determination. Any criteria addressing national natural landmarks should require joint review and concurrence by the Heritage Conservation and Recreation Service.

i. Endangered Species

Exceptions to this criteria must require the concurrence of, not consultation with, the Fish and Wildlife Service.

j. State Endangered or Threatened Species

The exception must require the concurrence of the appropriate state agency.

k.,l. Bald and Golden Eagle Nests

The 1/4 mile buffer for active nests is an arbitrary judgment based on no standard. Because we believe that this will guide a manager into making a limited decision rather than using geographic information about a particular nesting site, we suggest that this arbitrary limit be eliminated in favor of a requirement that a buffer be selected based on site determination. We strongly oppose the exceptions listed in these criteria. We believe the statutory authority for protecting eagle nesting sites is sufficiently strong to prohibit exceptions which would jeopardize their complete protection. If any exceptions were to be included, they must be subject to the the concurrence of the Fish and Wildlife Service.

m. Falcon Cliff Nesting Sites

The same comment as above applies.

n. Migratory Bird Habitat

This criteria must require the concurrence of the Fish and Wildlife Service if mining is to be permitted.

o. High Interest Fish and Wildlife Habitat

As this criteria assumes that the high interest areas will have been identified by a state wildlife agency, we suggest that exceptions (i) and (ii) are only acceptable if the state concurs.

p. Wetlands

The problem with this criterion again lies in the exceptions. There are no standards given which would guide a determination under exception (ii). There is no requirement that a land manager would have available the necessary information to make a decision under exception (ii). We recommend that these exceptions be deleted, unless a responsible agency or task force be appointed on a nationwide, state or regional basis with the expertise necessary to make this determination. As presently written, this criterion does not fully meet the intent in the President's Executive Order on Wetlands (E.O. 11990). We recommend that this criterion be redrafted to track the definition of wetlands contained in the Executive Order.

q. Floodplains

The first exception in this criterion assumes that an area must be leased. This exception is even broader than used in other criteria and we do not see the need for including it here. We recommend its deletion. Exception (ii) makes a judgment that mitigation is possible but as with other exceptions provides no standards for making such a determination. Specific standards must be included to ensure compliance by the Interior Department with the President's Executive Order on Floodplains (E.O. 11988).

s. National Resource Waters

It is unclear how the land management agency would have the jurisdiction to determine that "it is not necessary to protect the National Resource Waters." This exception is totally unacceptable, and must be deleted.

t. Prime farmlands

This criteria has defined prime farmlands as being related to crop yields. It is unclear in the language of the criteria whether crop yields implies both planted crops and vegetation yields in grazing lands. We recommend that this criteria include grazing lands in its definition as prime farmlands as much of the area where leasing could occur is used primarily as grazing land. An alternative would be to include a separate criteria to protect productive grazing lands from disturbances from surface mining.

u. Alluvial Valley Floors

This criteria is specifically geared to the requirements of the SMCRA of 1977. As such, we recommend that the criteria require that the land management agency must have completed an inventory and review of alluvial valley floors at the time a land use plan is prepared. Furthermore, this criteria must be geared to guidelines developed by OSM for identifying alluvial valley floors.

v. Reclaimability

This criteria indicates that information on reclaimability is not now available. It requires using this criteria as the information becomes available, but does not explicitly state that the information must be available prior to an assessment based on the criteria. We suggest that this be amended to state that information on reclaimability must be available at the time the assessment is made.

w. State Criterion

As in earlier criteria, we suggest that any exception of the state criteria must be done with the concurrence, not simply consultation, of the state.

x. Buffer for state lands

Any exception to this criteria must require concurrence, not consultation, with a state.

4. Subpart 3425 - Emergency Leasing

Subpart 3425 outlines a procedure for emergency leasing of federal coal which would circumvent the normal leasing process. The key element to these provisions are the criteria that would be used in determining whether an emergency leasing situation exists, as outlined in Section 3425.2, Conditions of Acceptance. These conditions as proposed do not require demonstration of true emergency situations. Rather they open almost limitless opportunities for special treatment. No ceiling is placed on the size of an emergency lease. Section 3425.2(a)(i) almost invites the formulation of an "unforeseen" contract to justify an emergency lease. Section 3425.2(a)(ii) fails to define "bypass." Virtually every mining operation in the Powder River Basin borders on additional coal. Section 3425.2(b) even permits emergency leasing to initiate a totally new operation so long as it is "in the public interest." If there is a broader standard it is difficult to think of.

The only real limitation on the Emergency leasing provisions is the requirement that "the integrity of the normal leasing process" not be violated. Literally applied, that provision would nullify the entire section. Since it is obviously not to be taken literally, it is incurably ambiguous. If emergency leasing provisions are necessary, the Department would do far better to stick close to the provisions agreed to by the parties in NRDC v. Hughes which have proven workable and are known to BLM and industry.

5. The Process for Setting Regional Targets Does Not Guarantee Adequate Environmental Protection.

As indicated above, the DES and the example regulations fail to provide the needed assurance that this significant element of the proposed coal program will, in fact, afford adequate consideration of the environmental and socio-economic impacts of coal leasing and subsequent development within the eight regions containing federal coal. See, pp. 70-75 supra. Indeed, it is entirely possible that, in adjusting DOE's national coal production target, the Department could increase that target and still maintain that it had considered such impacts. Moreover, although the DES states that the preliminary targets will be flexible, "with the final targets actually being developed as part of the analysis in the ranking and selection process," p. 3-23, the description of the use to which the preliminary figures will be put suggests that the process will inevitably be self-fulfilling. Thus, the draft states that they will be used "to set data gathering and planning priorties to ensure that a sufficient number of tracts" are delineated "for the desired level of development." Id.

6. The Ranking Process Does Not Ensure Adequate Environmental Protection

As indicated above, the Department has not yet developed the standardized procedures needed to ensure that the ranking of tracts within regions is conducted in an objective and balanced manner which will fulfill Departmental objectives. See p. 73-77 supra. Even assuming that the standards developed for ranking are objective and comprehensive,[45] the proposed ranking process poses several clear problems. First, since the object of ranking is to determine the "optimum" tracts for leasing within each region, p. 3-23, all multiple use plans within a region should be on the same schedule, in order to achieve this objective and avoid skewing the process. The Department, however, does not intend to require any such regional coordination.[46] Further skewing will result from the Department's decision to allow nominations by the coal industry to play a "critical" role in preliminary tract delineations. (p. 3-4.)

In addition, although the Department proposes to rank tracts to identify those lands most suitable for mining in each

[45] We believe that the criteria for ranking should include the following in addition to those specifically mentioned in the Draft statement: (1) least soil productivity; (2) least effect on surface and ground water quality and supplies; and (3) consolidated coal development versus dispersed development.

[46] Including areas not yet delineated as preliminary lease tracts in the ranking process, p. 3-23, will mitigate this problem only partially since such areas could not be leased even if they were superior to all others.

region, it apparently is not going to take any action to ensure that the tracts are developed in the order in which they have been ranked. Thus, the DES states:

> "[A]s selections are made of individual tracts, the original rankings of the remaining racts might be altered and selected tracts would not necessarily correspond to the relevant order in which the individual tracts were originally ranked." (p. 3-22.)

The expressed reason for this result, which will be further assured where intertract bidding is used, is that

> "the potential environmental and social impacts resulting from development of any tracts in the same area would be cumulative, [and therefore,] the selection of the first tract might preclude selection, or lower the priority of, other highly ranked tracts." Id.

This rationale appears patently inadequate. The cumulative impacts which would result from development of any tracts in a given region should be revealed in the EIS and reflected in the final order of selection. Therefore, we believe that selection of tracts, as well as the order in which they are leased and developed, should directly correspond to the final ranking.

7. The Role Of The NEPA Process In The Program Must Be Clarified.

As discussed above, the DES' explanation of the relationship of this EIS to subsequent EIS's on future federal coal leases is unclear. See pp. 71 supra. We believe that the Department should clarify this explanation and, in particular,

indicate precisely what its intentions are regarding future programmatic supplements and statements. We believe that it is impossible for inter-regional tradeoffs to be considered in regional impact statements. Therefore, we hope that the Department will commit itself to the preparation of formal supplements or, where necessary, complete EIS's in connection with the setting of regional production targets.

8. The Provisions For Surface Owner Consent Are Inadequate.

Section 714 of the Surface Mining Control and Reclamation Act prohibits the Secretary from issuing a coal lease for surface mining purposes where the lands over the federal coal are privately owned, unless the "surface owner" has given "valid written consent" to such mining operations. Because 6 million acres of the 9.7 million acres of federal coal lands are overlain by private surface, p. 3-24, the requirement of surface owner consent will be a significant element of any future Federal coal leasing program. The treatment of this requirement in the preferred alternative is inadequate.[47]

The Department's preferred alternative includes the surface owner at two points prior to a lease sale. It includes "surface owner consultation" in land use planning as one of the preliminary screens which will be used in "the delineation of areas acceptable for further consideration for coal leasing."

[47] We agree, however, that even if the owner consents to surface mining, the Secretary of the Interior need not lease the lands involved. See p. 3-24.

p. 3-4. However, the inclusion of such consultation in planning is entirely discretionary with the local district manager. See pp. 3-18, 3-21; Example Regulations at A-18. Moreover, even if the surface owner indicates a definite preference against stripmining, his or her lands need not be removed from further consideration. Id.

The preferred program also provides that the surface owners written consent will be obtained in the pre-sale and sale stages, p. 3-24, after tracts have been delineated, analyzed and selected, EIS's have been completed, and public hearings held. Even if the surface owner refuses to consent at this point, however, a tract can be offered for sale "if it was considered important." (p. 3-25.) In such cases, the coal company will be given a specified period of time after the sale to obtain consent. If this consent cannot be obtained, the sale would be voided. Id.

The problems with this approach are obvious. District managers and state directors are given unremitted discretion to ignore the surface owners' refusal to consent to surface mining up to and including sale of a tract. (p. A-18.) By delaying the need to obtain consent to the lease sale stage, the process will necessarily result in severe and often intolerable pressure being applied to the surface owners by companies and neighbors. Moreover, the Department admits that this approach could result in wasted time and money. (p. 3-37.)

We believe that consultation with surface owners should be required during the land use planning process and moreover, that planning for a lease should be prohibited where the surface

owner expresses a definite preference against stripmining. In addition, we believe that no tracts should be put up for sale unless all required consents have been obtained, regardless of how "important" those tracts may be.

9. The Objectives Should Be Clarified.

Section 3420.0-2 states the objectives of the leasing program. Language should be added to specify that coal shall be leased only pursuant to comprehensive sustained yield resource management planning.

10. The Process For Evaluating Coal Needs Should Be Clarified.

Section 3420.3 sets forth the process for the cyclical determination of the need for leasing and the establishment of production targets. This process is too important to be left nebulous. Clear requirements for early public involvement should be included. Criteria for the Secretary's determination should be set forth.

11. The Regional Tract Ranking Process Should be Clarified.

Section 3420.4-4 sets forth the process for regional tract ranking. It implies but does not delineate the parameters of a sharing of the Secretary's power with representatives of the state Governors. We believe such a sharing of authority is inconsistent with the obligations of the Secretary to manage the Nation's lands. However, if it is to take place, it should be within explicitly stated binding limits. When, where, how and within what limits the authority is to be exercised must be defined.

CONCLUSION

The DES suggests that the Department has confronted important issues and has limned the broad outlines of a logical resource management policy, but the details of the policy fail to fulfill the promise of its form. Similarly, the DES itself raises but does not resolve major environmental and social issues. The value of both the proposed leasing policy and the DES is rendered wholly ambiguous, however, by the Department's inexplicable determination to hold a mid-1980 lease sale.

We urge the Department to discontinue its efforts to prepare for an early lease sale and to turn its efforts solely toward the development of an effective and environmentally sound resource management policy.

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February 13, 1979

Office of Coal Management (140)
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090

Dear Sir:

Western Fuels Association, Inc. submits these comments on the Draft Environmental Impact Statement on the proposed Federal Coal Management Program (DEIS) which was issued in December 1978.

Western Fuels is a non-profit corporation organized under the laws of Wyoming the members of which are numerous REA generating cooperatives and other publicly-owned (as distinguished from investor-owned) utilities. Most of Western Fuels members are located west of the Mississippi. Cajun Electric Power Cooperative, Inc., the REA G&T Cooperative which serves practically all of Louisiana, is also a member of Western Fuels.

Western Fuels was organized because the publicly-owned sector of the utility industry was finding it increasingly difficult to obtain assured coal supplies at reasonable cost for thermal generating stations. Western Fuels has responsibility to supply all the coal needed by the Missouri Basin Power Project's 1500 megawatt Laramie River Station located near Wheatland, Wyoming. The coal demand of this plant will total 7,000,000 tons of coal per year at peak production.

Western Fuels has acquired applications for preference right coal leases in the East Powder River Basin of Wyoming and has entered into an agreement with El Paso Energy Resources Company which also has acquired preference right lease applications in the East Powder River Basin under which Western Fuels has the right to have the strippable coal mined by El Paso for Western Fuels' account.

Because of delays by the Department of the Interior is issuing preference right leases, Western Fuels has found it necessary to go on the market and acquire fuel supplies to meet start-up dates for generating stations of its members now under construction. Western Fuels, therefore, has an obvious interest and is directly affected by the proposed Federal Coal Management Program. 1/

Western Fuels Board of Directors has formally adopted principles and goals for the organization. The first two of the principles and goals state:

> An adequate reliable supply of energy is vital to a healthy economy and a decent standard of living for all.
>
> In supplying this need, the energy industry must seek to eliminate all possible existing and potential negative impacts it may have upon the environment.

It is in this spirit that these comments are submitted.

Two general points on the tone and premises of the DEIS are appropriate prior to specific comments on particular portions of the DEIS.

First, the tenor of the DEIS reflects an apparent attitude of the Interior Department of uncomfortable acquiesence to the proposition that coal must be mined in order to serve the nation's energy needs and an equally uncomfortable acquiescence to the proposition that federal coal must be utilized in the process. This nation is extremely fortunate to have such a plentiful supply of energy. The rational development of that energy source should not be acceded to grudgingly but must be undertaken optimistically, perhaps even thankfully.

Particularly in light of recent events in Iran, the

1/ Western Fuels has previously exhibited its interest in federal coal matters by active participation in and comment on federal coal decisions. Also, Western Fuels has sought to intervene as a defendant in the lawsuit entitled Natural Resources Defense Council Inc. v. Hughes which involves the coal programmatic EIS. Western Fuels is currently before the Supreme Court of the United States seeking review of a denial of intervention into that lawsuit.

fragile nature of the world energy market has again been underscored. To the extent that coal development can place some rationality and assuredness into our national energy picture, that development should be welcomed. The President's National Energy Plan which was released in April 1977 places great reliance on the development of our native resources -- particularly coal. With such an impetus for federal coal development, the DEIS should reflect a firm disposition toward rational, economic and environmentally sound development of our coal resources.

Western Fuels makes three recommendations for remedying this shortcoming in the DEIS. First, section 1.4.1 of the DEIS entitled "Role of Coal in National Energy Policy" should be substantially expanded. Second, a fuller analysis should be made in the final environmental impact statement (FEIS) of the present and projected need for coal, and particularly federal coal, to serve the nation's energy needs. Third, the tone of the FEIS should reflect a desire to maximize economic coal development consistent with sound environmental safeguards.

The second background issue concerns the analysis of the federal laws now in effect which are designed to minimize environmental damage resulting from various aspects of federal coal development. These laws are summarized at section 1.3.1 of the DEIS. A further analysis of the impact of these laws on coal development would be valuable in evaluating the impact of the preferred program and alternatives for federal coal development.

Historically, severe abuse of natural resources has occurred in surface mining of coal. These are still visible, particularly in the Appalachian region. However, these abuses can no longer occur in large part because of the passage of the Surface Mining Control and Reclamation Act of 1977. An in depth analysis of federal laws governing coal development will impart to the reader of the FEIS an understanding that the limitations on development which appear in the preferred program, or whatever alternative is chosen, are not the only regulations in existence. The program must be viewed not as the last barrier to mindless coal development, but rather as one part of a multi-faceted federal system which will permit rational utilization of federal coal assets.

Comments on specific portions of the DEIS will now be considered.

At section 2.4 of the DEIS, a discussion is had concerning the impact of the Clean Air Act Amendments of

1970 and 1977 on power generation. This section of the DEIS is conclusory in style and should be expanded. Specific examples of the difficulty certain eastern utilities are experiencing in complying with these air standards and a summary of litigation engendered by these standards would aid the reader of the DEIS in properly evaluating the pressing need for the development in timely fashion of western federal coal resources.

Section 2.5, and particularly section 2.5.1 should be expanded to more fully consider the volatility of the international petroleum market. The DEIS, at this section references the "major national reassessment of future energy directions." The President's National Energy Plan referenced above clearly envisages expanded coal development. The interrelationship of federal coal development with the alternative sources of energy referenced in section 2.5 should be more clearly laid out. This is an opportune point to underscore the availability of federal coal to meet the nation's energy needs.

The opening paragraph of section 2.7 of the DEIS states:

> The DOE forecasts of future coal production were based on the assumption that Federal and non-Federal coal resources would be fully available to meet the demands for western coal.

Nowhere in the DEIS was there a full analysis of the impact on the DOE forecasts of a limitation on federal coal availability. Such an analysis is necessary for the reader of the FEIS to be fully cognizant of the importance of western coal to the nation's energy plans.

The DEIS does make clear that decisions made on the basis of the FEIS will not have immediate effect on the amount of coal available for usage. The DEIS reflects at section 2.8.1 that the regulatory and industrial aspects of coal development are of such a complex and time consuming nature that a decision today to lease federal coal will not result in one ton of coal being mined until, perhaps, seven years into the future. A fuller analysis of the causes of this hiatus is necessary to fully apprise the reader of the FEIS that action is required now on federal coal leasing. An expansion of this section could include a more detailed analysis of the regulatory hurdles placed before a potential developer of federal coal and an analysis of the developer's

activities in opening a mine, including financial ativities, the fabrication of necessary mining equipment, etc.

Section 2.8.2 of the DEIS at page 2-48 indicates that a decision by the federal government not to lease federal coal could result simply in a shift to the development of non-federal coal sources. A full analysis of the impact of the development of non-federal coal as opposed to federal coal resources is necessary to fully apprise a reader of the FEIS of the importance of federal coal leasing. There should be included in the expanded analysis the impact, economic and otherwise, of the development of private coal resources in the confines of the "checkerboard" configuration of lands in the west. Also, the reader of the FEIS should be keenly aware that additional land use planning and environmental controls are placed on federal coal development as opposed to non-federal development. Thus, if the quid pro quo for a refusal to allow federal coal to be leased is non-federal development, the reader of the FEIS should realize that the potential exists for more, not less, environmental disruption.

Also in section 2.8.2 of the DEIS, at page 2-49, reference is made to the fact that a decision not to lease federal coal could result in a shortfall of coal in the overall national energy picture. The impacts of that shortfall are treated in the DEIS in cursory fashion. Expansion of the discussion of this impact is necessary.

Section 2.8.3 of the DEIS reflects the Interior Department position that it "has little choice legally but to process" preference right lease applications (PRLAs). In all due respect, this cavalier and begruding attitude of the Interior Department to the rights of preference right lease applicants is offensive to Western Fuels and to others similarly situated who have invested substantial money and effort in reliance upon the faithful discharge by the Department of the Interior of its duty to carry out the law. Western Fuels has expended substantial monies in activities involving its PRLAs without yet having mined one ton of coal. The PRLA system was a substantial part of the federal coal program for in excess of fifty years. Western Fuels' position, regardless of the alternative chosen for federal coal leasing, is that Western Fuels holds a legal right to timely issuance of the leases it has requested.

Section 2.8.4 of the DEIS reflects the fact that federal coal leasing can stimulate competition in the coal industry. Western Fuels subscribes to this analysis and urges expansion of this section in the FEIS.

In section 3.1.1 and 3.1.1.6 of the DEIS a discussion is had of the interrelationship of the preferred program for federal coal leasing with the processing of PRLAs and lease issuance. A much fuller discussion of PRLA treatmant must be included in the FEIS which would consider, inter alia, the application of environmental and planning standards to PRLAs, the procedure to be followed if preference right lease issuance for a specific lease is opposed by the Department and the legal basis for any non-issuance of a preference right lease. Part 3430 of the example regulations, Appendix A to the DEIS, 2/ are of some assistance, but they do not fully delineate the impact of this treatment of PRLAs.

As is clear from the entire tenor of the these comments, Western Fuels opposes the "No Federal Leasing" alternative described in paragraph 3.1.2. In Western Fuels' estimation, this alternative would violate Western Fuels' rights as a preference right lease applicant and could result in a shortfall of the amount of coal necessary to supply the nation's energy needs.

The preferred program for coal development is described in the DEIS generally in Chapter 3. Western Fuels' primary concern with the preferred program involves industry participation in the leasing process. First, the preferred program permits industry involvement which is both too little and too late. As is clear from sections 3.2.1 and 3.2.2, the initial opportunity for input by industry occurs after the basic land selection decisions have been made. In undertaking the initial selection of tracts to be considered, the federal agencies take on a heavy responsibility of determining needs and balancing those needs against the numerous other factors impacting decisions to mine coal. In the final analysis, it is industry which develops federal coal resources. Industry's input is both necessary and appropriate at the earliest stages of the planning process. This input must occur prior to initial selection of lands.

Further, the level of industry input is too small. In the preferred program, only industry "expressions of interest" are permitted. Western Fuels submits that industry should be permitted to submit nominations, rather than merely expressions of interest.

2/ It is Western Fuels' understanding that these regulations are not yet proposed. When and if they are proposed, Western Fuels will comment fully upon them.

The expressions of interest described in the DEIS at section 3.2.5 are not idle musings of the industry. The expressions of interest apparently must include maps, geologic data, mining methods, proposed transportation system, etc. This data, which can be developed only by expending great amounts of time, energy and dollars, can in many instances be proprietary in nature. Some alteration of the leasing system must be made either to keep the submitted data comfidential or to give the entity which develops the data some preference in the leasing of that land. A plan which calls for the submission of substantial data which can be used by one's competitors and does not place one in a preferential leasing status will not evoke substantive industry input.

In sum, basing the preferred program upon government initiative to select the tracts to be offered assumes both a level of funding, a level of capable staffing and an efficiency that to students of government are simply an "impossible dream." Why the market and private demand cannot be entrusted with the initial nomination process is simply not demonstrated.

In section 3.2.6 of the DEIS, the special leasing opportunities for public bodies and small business are discussed. Western Fuels supports this concept but urges expansion of the discussion in the FEIS to include a consideration of the amount of coal land which would be available for special leasing opportunities and the precise procedures which would be utilized.

In Chapter 5 of the DEIS, there is not sufficient discussion of the impacts of a federal coal leasing program, such as the no leasing alternative, which would result in the increase of the development of non-federal coal sources. The impacts from increased non-federal coal development should be discussed in the FEIS.

Section 5.4.8 and Tables 5-72 and 5-73 discuss the unsuitability criteria utilized by the coal task force in the summary of 1978. The proposed unsuitability criteria which were published in the December 8, 1978 Federal Register (43 Fed. Reg. 57668-57670) differ substantially from the unsuitability criteria discussed in the DEIS. The body of the FEIS should reflect the new proposed criteria and should contain sufficient information to permit a reader of the FEIS to know what areas of federal coal lands will be deemed unsuitable under each criterion and what amounts of coal will be excluded from consideration for development by utilization of each criterion.

Finally, although an in depth discussion of the example regulations has not been undertaken here, one specific item will be discussed. Example regulation, 43 C.F.R. §3461.1(d) states that certain unsuitability criteria will not be applied "to lands on which surface mining operations were being conducted on August 3, 1977, or where substantial financial and legal commitments to the operations had been made prior to January 4, 1977." This language is not sufficiently specific to give any guidance concerning the applicability of the criteria to lease lands. Similar loose wording concerning "commencement of construction" in the 1977 Amendments to the Clean Air Act have engendered substantial litigation. A similar effect here could be avoided by drafting explicit requirements for this exemption.

Sincerely yours,

Edward Weinberg
of DUNCAN, BROWN, WEINBERG & PALMER, PC

EW:vcr

cc: Ken Holum

THE CARTER OIL COMPANY
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W. CARTER GARRETT, JR.
SENIOR VICE PRESIDENT

February 12, 1979

Federal Coal Management Program -
Draft Environmental Statement

The Honorable Frank Gregg, Director
Office of Coal Management
Room 3610, Main Interior Building
18th and C Streets, N.W.
Washington, D. C. 20240

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Dear Mr. Gregg:

The Carter Oil Company welcomes this opportunity to submit comments on the Draft Environmental Statement for the Federal Coal Management Program issued December 15, 1978. These comments are submitted in accordance with the invitation for review and comments published in the Federal Register on that date.

At this time, we have identified six problem areas within the preferred management program that concern us substantially. Our comments upon the preferred program are organized in response to these six concerns.

I. Areas Unsuitable Criteria Must Be Revised and Public Input Invited in Their Application

As proposed, the areas unsuitable criteria would be applied to exclude lands from potential coal leasing, without giving consideration to underlying coal resources. We strongly recommend that balance must be introduced at this stage of the land-planning process. To adequately protect the public's valuable resources, the value of these energy resources must be weighed and considered together with potential environmental impacts before a determination of unsuitability is made.

Compatible uses should be encouraged. Placing limitations and/or standards on mining so as to make that activity compatible with other potential land uses is preferable to the alternative of ruling out mining on coal rich federal lands. Consideration also should be given to the possibility of relocating incompatible uses temporarily, and to the ability of mine operators to reclaim and restore lands subsequent to mining activities. It must be remembered that the Office of Surface Mining's reclamation standards assure that lands will be properly reclaimed contemporaneous with mining activities.

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Under the preferred program, there is little or no opportunity for public input in the areas unsuitable decision-making process. Yet, the President, in his State-of-the Union message sent to Congress, recently endorsed improving the quality of regulations "by providing opportunities for interested parties to participate in regulatory proceedings." The endorsement is in accord with the Administration's domestic policy priority to make "government more efficient and effective..." Therefore, we recommend that, pursuant to more formal procedures, notice should be given, and opportunity provided for the public to be heard prior to any determination of unsuitability. An administrative record should be generated to support the agency's decision. Such procedures would allow for multiple use considerations, and would improve the data on which the agency's decision is made.

We acknowledge the necessity to apply mandated unsuitability criteria prior to future leasing, but call your attention to the inequity, expense and burden of applying them retroactively to existing leases and preference right lease applications. Applying area unsuitable criteria to preference right lease applications and to existing leases potentially constitutes inverse condemnation, requiring compensation to owners denied use of their existing property rights. Such retroactive applicability is analogous with zoning out existing nonconforming uses, which traditionally have been exempt from new zoning provisions. Application of the proposed criteria to preference right lease applications where coal has been found in commercial quantities would be clearly contrary to the NRDC v. Berklund decision, which held that the Secretary of the Interior has no discretion to reject a preference right coal lease application on purely environmental grounds.

In the event that unsuitability criteria nevertheless are applied retroactively to such areas, existing leases and preference right lease applications should be reviewed for conformity upon request of their owners. Review upon mine plan submittal or lease application processing, as proposed in the preferred program, would force property owners to incur substantial additional expenses in the preparation and submittal of such plans and applications.

It is essential that the areas unsuitable criteria as proposed should be revised in line with statutory authority, so as not to exclude a valuable public resource unnecessarily at the initial stage of the federal coal management program. We respectfully refer you to our comments submitted to the Bureau of Land Management in response to that agency's December 8, 1978 Federal Register notice on this subject.

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II. Opportunities for Public Input are Inadequate as Proposed

It is appropriate for the federal government to examine reliable, timely forecasting data made available to it by a variety of sources, thus enabling the government to prepare its projections and set its production targets on the basis of the best evidence available. The importance of such production targets cannot be over emphasized, as forecasting errors would likely result in an imbalance of supply and demand, which could be difficult if not impossible to correct in light of the long lead time now necessary to obtain permits and approvals to open a coal mine. Such information can be obtained by providing the opportunity for the public as well as the federal government to initiate lease sales. In the land-use planning process, too, opportunity for participation of all interested parties is essential to evidence the public's priorities in assessing land use and to improve the quality of decision making.

We therefore urge that the preferred federal coal management program be revised, in line with Executive Order 12044, to facilitate public participation and also to provide for public initiated leasing.

III. Surface Owner Consent Should Be Required of Non-Qualified Owners

The surface owner that does not qualify pursuant to Section 714 of the Surface Mining Control and Reclamation Act of 1977 for the considerations therein mandated by Congress ("nonqualified surface owner") should not be allowed to distort the competitive bidding situation. To avoid this problem from occurring, the transferable consent of the nonqualified surface owner should be required to be on file with the Bureau of Land Management before a lease sale affecting his tract is held, just as is required of qualified surface owners in possession of the surface overlying federal coal. The appropriate reimbursement to the nonqualified consenting surface owner would be fair market value, payable by the successful bidder in the lease sale.

The preferred program should be revised, in accord with the provisions of the Surface Mining Control and Reclamation Act of 1977, to provide that the Bureau of Land Management should not consult with surface owners regarding their willingness to consent to coal mining until after tracts of land have been ranked for potential for coal leasing. In this manner, tracts of land overlying public energy reserves will not be removed from consideration unnecessarily early.

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IV. The Single Tract Sales System and Cash Bonus Bidding Method Should be Used

The public interest is best served through the use of the single tract sales system, which results in lower end use costs, administrative efficiency in the planning process and a more equitable comparison of competitive bids. The intertract sale system inequitably forces comparison of bids on different tracts, because adequate consideration cannot be given to differences in coal mining, processing, transportation and reclamation expenses.

The cash bonus bidding method, of the five methods of bidding considered in the preferred program, is best suited to the government's coal management goals. Cash bonus bidding maintains strong incentive for development on the part of the successful bidder. It also reinforces the incentive for diligent development otherwise required by the federal government. Royalty and deferred payment bidding methods, on the other hand, encourage lease speculation.

V. The Federal Government Should Not Designate End-Use

End-use decisions should be left to market forces. Designations of end-use by the Department of the Interior would be contrary to the Administration's goal of restraining inflation and to President Carter's directive, in his January 23, 1979 State-of-the Union address, to "fight inflation... by reducing government obstacles to competition in the private sector."

VI. The Definition of Maximum Economic Recovery Must Be Revised

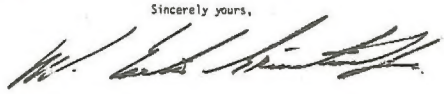
The proposal to define maximum economic recovery as "collective profitability" would increase the cost of coal to the consumer by requiring the recovery of coal that the prudent operator would not otherwise mine. It would be preferable to continue the U.S. Geological Survey's current vigorous enforcement of Congress' mandate to ensure maximum economic recovery, as the Office of Surface Mining has chosen to do in its proposed surface mining regulations, rather than to increase the consumer's costs by adopting the present proposal.

Furthermore, maximum economic recovery as proposed could require production of coal that the consumer cannot readily use because it fails to meet quality specifications for boiler design, or to otherwise fulfill contract requirements for the market's coal needs. Finally, the impact of the definition as proposed would be counter-productive to achieving the domestic priorities set forth in the President's recent State-of-the-Union message, and contrary to his pertinent reflection, expressed in that message, on "the advantages of letting the competitive market, rather than government, control industry performance."

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The Carter Oil Company thanks the Department of the Interior for this opportunity to comment on the Draft Environmental Statement for the Federal Coal Management Program. We urge the Department of the Interior to make the modifications to the preferred program necessary to assure that the federal coal management program that is adopted will best serve the public's energy, environmental and economic needs.

Sincerely yours,



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STATE OF UTAH

SCOTT M. MATHESON
GOVERNOR

OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114

February 9, 1979

The Honorable Cecil D. Andrus
Secretary of the Interior
Department of the Interior
Washington, D.C. 20240

Dear Cece:

I want to take this opportunity to commend you, Guy Martin, Steve Quarles, and the rest of your coal leasing staff for the outstanding manner in which you have involved the States in assembling the new Federal Coal Management Program. In my opinion, the new Draft Environmental Statement represents a substantial improvement over past federal efforts in this area. It is a well organized document developed in a logical fashion and written in a very readable style. Of particular importance is the sensible way the document addresses the "Need for Leasing" issue. The qualitative justifications for renewed leasing, when taken together, offer a compelling justification for having a system in place to meet future contingencies. I am convinced that this new leasing system will give us the capacity to significantly improve the way in which federal coal development proceeds, from both environmental and socio-economic perspective.

It is necessary to qualify my optimism with several caveats. First, the Department of Interior must continue its recent efforts to make State and local government full partners in its land use planning activities in general and its coal leasing activities in particular. Second, we must make clear to the President, the White House Staff, the Office of Management and Budget, and especially to the Congress that land use agencies must have significantly increased funding to efficiently and expeditiously handle the many new responsibilities thrust upon them by recent legislation. It is clearly Congressional and Presidential intent that public lands and resources be managed in a manner that maximizes a variety of multiple-use values without significant environmental damage. If the coal leasing program is to operate to help meet the President's goal of doubling coal usage by 1985, then it must not lose out in budgetary squeeze that seeks to spread fewer dollars over more and more programs.

Finally, I must reiterate a point that I made to the White House staff during a briefing on reorganization proposals for a Department of Natural Resources. No matter how elegant a system for land use planning, or coal leasing, we erect, the success of that system's

operation will depend to a large extent on the quantity and quality of information readily available by which to guide the specific decisions. I am aware that efforts have been made to reorganize and integrate the disparate and duplicative data systems in each of the various federal land and resource agencies. But I believe that until this becomes a top priority of the Department and is so reflected in the resources provided to carry out the effort many of the key decisions will continue to be delayed or made based on insufficient information.

What follows are specific comments on the Program and the DES. If I can be of any further help to you in getting this program in place, please let me know. Thank you again.

Sincerely,

Governor

SMM:kb
Encl.
cc :Guy Martin
Steve Quarles

STATE OF UTAH

COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT

FOR THE FEDERAL COAL MANAGEMENT PROGRAM

STATEMENT OF PHILOSOPHY AND PERSPECTIVE

The implicit assumption of this draft environmental statement is that state governments have failed to express a preference for an alternative program in which states would control the quantity, location, and timing of coal leasing and development within their respective borders. This is not true from the State of Utah's perspective. Let the record clearly show our belief that at the state and local levels of government Utah clearly possesses the collective will, expertise, and resources to plan for and carry out a comprehensive, state-wide is the unfortunate reality of federal control of so much of our land and coal resources that leads us to fall back on a second-best policy -- specific comments on the "Preferred Alternative". Let us take this opportunity to express our belief that without adequate resources provided to the state and field offices of the Bureau of Land Management, and without discipline and restraint in the Washington, D.C. offices to not meddle in decisions reached jointly between state governments and the respective counterparts in BLM state and field offices, then this program will simply become one more link in a lengthy chain of federal regulations inhibiting the mineral industry in Utah.

STATE OF UTAH

COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT

FOR THE FEDERAL COAL MANAGEMENT PROGRAM

WILDLIFE CONCERNS

This document reflects the extensive state-federal coordination and consultation that has occurred over the past year. It generally addresses the potential impacts on wildlife in a satisfactory way; however, there are some points of concern. These are discussed sequentially by chapter, section and page number.

Chapter 2 - The National Energy Role of Western and Federal Coal

Section 2.9 emphasizes that, "... new federal leasing is needed to ensure that future western coal development is carried out as efficiently and with as little damage to the physical and human environment as possible." We agree with this basic concept for coal leasing. The relative abundance of coal affords an opportunity to focus development in those areas that are least environmentally damaging. The leasing process can assure accomplishing this objective.

Chapter 3 - Description of the Preferred Coal Management Program and Alternatives

We agree with the approach outlined in the preferred program but are concerned with the process for NEPA compliance. As we interpret Section 3.1.1.7, page 3-6, there are three broadly based environmental impact statements (national, regional and planning stage) and too little emphasis on site-specific impacts. The Preferred Alternative Program described in the EIS should make clear that the requirement for a site-specific environmental analysis will be performed prior to approval of the mining plan. This is required by the Surface Mining Control and Reclamation Act (SMCRA).

In Table 3-1, page 3-10, the criterion for State Resident Fish and Wildlife must be modified. The second paragraph of this portion should read:

Examples of such lands include:

Critical breeding concentration areas (dancing grouds, strutting grounds)
Migration corridors for big game
Critical big game winter ranges

In Table 3-1, page 3-12, the CRITERION and EXCEPTIONS portions for Falcon Cliff Nesting Sites (bottom of page) are incomplete. The last sentence of each was apparently excluded in typing. They should read as follows:

CRITERION "Consideration of availability of habitat for prey species shall be included in the determination of buffer zones."

EXCEPTIONS "Buffer zones may be increased or decreased if the land management agency determines that the active falcon nests will not be adversely affected."

The discussion of "Threshold Development Levels," Section 3.2.1.4 on page 3-21, indicates that thresholds will be established limiting wildlife losses to a certain acreage or a specified population decrease. Such value judgements must be made in terms of habitat units not animal numbers. The latter are too dynamic to adequately serve this purpose.

In relation to Section 3.3.5, page 3-41, we reiterate that post-programmatic environmental analysis must provide more emphasis on site-specific analysis, as required by law.

Chapter 4 - Description of Regional Environments

Section 4.9 Uinta-Southwestern Utah Coal Region. A description of the coal resource (types, quantity) should be included and should reflect variability of the resource. Fishing and hunting, plus other recreation-oriented activities, should be included as significant economic characteristics of this region.

Chapter 5 - Regional Impacts of Federal Coal Management Program Alternatives

In Section 5.2.2.1, page 5-17, low precipitation is identified as a factor limiting reclamation potential in the San Juan River area and the Red Desert portion of the Green River-Hams Fork Region. Some of the Uinta-Southwestern Utah Region is similarly limited. We feel that the range of reclamation potential shown for this region in Table 5-9, page 5-22, is inadequate. Certain sites are equally as harsh as those in the San Juan Region, although these represent a limited amount of the area.

The potential impact of subsidence on water availability in springs and seeps water and mesic micro-habitat sources extreme important to wildlife, should be addressed more fully in Section 5.2.2.6, page 5-26.

In Section 5.2.3.3, page 5-81, the "...cold clear waters of the Green River...." in the Green River Hams Fork Region are described as supporting the endangered humpback chub, Colorado squawfish and Kendall warmsprings dace. This is totally untrue. The humpback chub and squawfish are restricted to lower quality, turbid waters of the Colorado River System and the dace to Kendall Warm Springs in Wyoming.

Additionally, the Utah prairie dog does not occur in the Green River-Hams Fork Region. This should be included in the discussion of the Uinta-Southwestern Utah Region.

The discussion of endangered species in the Uinta-Southwestern Utah Region indicates that "...at least 10 endangered species" occur in this region. Presumably this includes the Yuma clapper rail listed in Appendix Table D-2, page D-7. This species has never been observed in Utah and should be excluded from that table.

Chapter 6 - Mitigation of Major Adverse Impacts of a Federal Coal Management Program

Opportunities for mitigation should be provided on a site-specific basis. We question that the regional EIS approach will accomplish this objective. The preferred program should clearly describe its links to these process called for in SMCRA.

A mitigative or compensatory measure not mentioned in this document would be to provide habitat improvement concurrent with or preceding development of a coal mine in adjacent areas. This could provide habitat sufficient to sustain displaced animals in some instances and minimize the losses to wildlife for the thirty-to-thirty-plus year project life and until reclamation can be accomplished. This would be far preferable to an approach of using the unsuitability criteria as a means to exclude areas from any development, before the lands have been examined in detail for these kinds of possibilities.

Appendix D - Ecological Data

The Uinta-Southwestern Utah portion of Appendix Table D-1 should be modified to include one antelope per 150 acres and one mule deer per 50 acres. Division of Wildlife Resources' estimates of carrying capacity for 15 deer herd units in Utah averages one deer per 47 acres.

Also, we wonder if the pounds of fish per acre-foot values included for streams and reservoirs should be pounds per acre. The values reported seem high where expressed on an acre-foot basis.

In earlier correspondence, we recommended that potential losses of wildlife incorporated in Table D-5, pages D-13 through 34, be identified in terms of habitat units, not animal numbers. We reiterate that recommendation here. It is the State position that the numbers shown do not provide an adequate base for impact assessment or ultimate establishment of thresholds.

UNSUITABILITY CRITERIA

The unsuitability criteria represents a sensible conceptual approach that, if applied properly, will greatly improve patterns of coal development, and simplify and speed the process of lease approval. However, this section should contain a statement in philosophy that makes clear the manner in which they are to be applied. As a statement of policy, a directive should be given that the application of the criteria should be carried out in a manner that has as its objective the goal of finding ways to make coal development compatible with other land uses. The way the criteria are currently phrased could convey the unfortunate impression that the objective is to exlude lands from development instead of finding ways for coal development to proceed in an environmentally acceptable fashion where practicable. There is a sound basis for such a statement in the Department of Interior's field test of the unsuitability criteria of last year. The conclusion reached by the field team carrying out the test in the Wattis planning unit in Utah reflected a belief that some level of development could proceed in practically every known area containing desirable coal resources, provided that such development was accompanied by intelligently conceived and effectively executed programs of compensation, mitigation, and/or stipulations. The key to this kind of informed flexibility is to place the decisions with the field officiers of the state and federal land and resource management agencies. A clear statement of that sensible and purposeful intent will create the atmosphere in which those who really know an area and its resources will be able to manage the land in a manner that maximizes the development potential of a number of seemingly conflicting multiple uses.

What follows are some specific comments on several of the criteria.

Page 3-13 Criterion on Reclaimability - This exception should be changed to read "or" rather that "and" approved state programs, including state regulation. By making this change, the reclaimability of an area is not tied to an inflexible nationwide standard. Reclaimability would be responsive to regional differences in topography, soils, vegetation, and climate. The much-discussed "State Window" concept of SMCRA would be utilized in each state's regulatory program, and the preferred program should emphasize that sensibly flexible concept.

Page 3-10 Criterion on State Resident Fish and Wildlife - In exception #1, change "complete mitigation" to "maximum mitigation". Complete mitigation would be, at best, very difficult to achieve and is, in fact, a contradiction in terms. However, the phrase "maximum mitigation" should be clearly defined and the purpose of the criteria fully set out. Development should only be allowed to procede if the coal resource is an outstanding deposit, and only if a reasonably comparable alternative deposit cannot be located in the vicinity. If the deposit clearly contains this unique, outstanding feature, development can proceed only in a manner that gives top priority to minimizing habitat impairment.

Page 3-20 (Third from the last paragraph) The department is commended for allowing this flexibility in designating areas unsuitable that will not experience surface effects from underground mining. It is suggested, however, that in the second sentence of this paragraph that "significant adverse" be inserted between "no" and "hydrologic". This change would allow the unsuitability criteria to not be applied in cases where hydrologic or surface effects would be favorable, or insignificant.

DESCRIPTION OF THE ENVIRONMENT

Several corrections need to be made in the description of the Uinta-southwestern Utah coal region. On page 4-36 it states that "six billion tons of coal reserves are estimated (to) be located in this region". Utah Geological and Mineral Survey reports that within Utah, there are 22.5 billion tons of coal reserves in place. Also, the Bureau of Mines Information Circular 8497, dated 1970, and titled "Coal Production from the Uinta Region, Colorado and Utah" states (p. 3) that 41 billion tons of reserve are present in this region.

CRUCIAL ISSUES AND ASPECTS OF THE PROGRAM YET TO BE FULLY RESOLVED

Production Targets

It is crucial that the limitations of the DOE production targets be acknowledged by sharply defining and structuring the role they will play in the federal coal management program. These targets can provide useful guidance in the determination of leasing policy at the national and regional level, but their limitations should be acknowledged in the program by allowing qualitative factors to moderate, or in some cases, override a "lease, no lease" decision indicated by these aggregate projections. The quantitative merit of the projections is greatly diminished with each additional disaggregation of the overall objective, from national, to regional, to sub-regional. These strictly quantitative hypotheses provide little useful information about the most significant factors in formulating leasing decisions. The qualitative considerations of such a program should focus on achieving optimal patterns of coal development from economic, environmental, and socio-political points of view. The opportunity to positively influence the way coal development in a sub-region proceeds should not be foregone because the regional or national numbers floating around in the DOE/DOI crystal ball fails to register a need. Conversely, a sub-region should not be forced to accomodate further leasing if there is good reason to believe such

possible development will have severe environmental or socio-economic impacts on the area regardless of what the production targets dictate.

The key to preventing either of these scenarios from occurring is for the federal coal management program to explicitly specify that the tract ranking and selection team, composed of one federal and one state representative from each state in the coal production region, lease more or less coal in the region by documenting the qualitative justification for departing from the aggregate guide. Such qualitative rationale could be provided by state, local or federal officials in the area, by industry or environmental groups, or by individual or micellaneous groups from the general public. These qualitative considerations could include economic, environment, socio-political, or other significant types of concern. The public participation process should provide any individual group the opportunity to comment on production targets and leasing decisions. The tract ranking and identification team should give due consideration to such comments in any decision to depart from the regional production target.

MAXIMUM ECONOMIC RECOVERY

The intent of the definition of maximum economic recovery contained in 3.3.6 is a good one. Minimization of surface disturbance is a sensible objective in both surface and underground mining. By limiting the area of surface disturbance, conflicts with other values and land uses, especially those associated with wildlife, can be minimized. But the desire to achieve maximum economic recovery cannot be the absolute, overriding, dominant concern. The definition of maximum economic recovery needs to be tempered with a common sense qualifier: The seams that are recovered within the scope of this collective profitability test must be marketable. The seams that are recovered within the same deposit are not necessarily homogeneous. The diversity in quality of the coal can be such that one or more of the seams may not be marketable end-use due to the poor or aberrant quality of the coal. An additional qualifier is that maximum economic recovery should be based upon coal recoverable from current, existing technology.

FAIR MARKET VALUE

The State of Utah clearly and unequivocally rejects the notion that the Federal Coal Leasing Act Amendments direct the federal bureaucracy to maximize its monetary return from each individual lease, or to use the coy euphemism employed by the advocates of this institutionalized avarice, "capture all the economic rent". It is a contradiction of the spirit of FCLAA, the creation of maximum competition, for the Department of the Interior to pursue the maximization of profits like some nineteenth century Robber Baron. The intent of Congress was to insure that the federal government receive a fair and reasonable return from private use of public resources. The best measure of "fair market value" is comparable transactions from state and privately-owned coal. Such an estimate based upon available data, will more accurately reflect market conditions -- hence "fair market value" -- than federal behavior suitable only to the most brazen attempts at a monopoly market.

An approach that seeks reasonable returns through a suitable combination of front-end bonus bids and royalty payments will maximize total revenues to the federal government over the long run. Efforts to extract everything the market bears from each individual lease can actually be counter-productive to production. At some level of production royalty or front-end bonus bid would be bidders will shift their capital to non-federal coal if these are available or even other types of energy resources. The intent of FCLAA was clearly

to get development of federal coal resources going -- not at any cost, but at fair and reasonable return to the owners of the public lands. An effort to extract maximize return off each lease can be motivated by a bureaucracy defensively misreading Congressional intent, or greedily misreading Congressional intent, or by distorting that intent to frustrate development of federal coal. Whatever the motivation, an insistence that "fair market return" is a license to pursue monopoly profits will hold down development of federal coal and aggregate returns to the treasury from that development. Those charges for front-end royalty bids will inevitably be passed back to the public in their roles as consumers of power, so it is fiction to prentend that the people experience a net gain from heavy front-end bonus bids or royalties.

PUBLIC BODY LEASING

The program for public body leasing should be carried out under the supervision of the joint state-federal coal selection and ranking team in each production region. The governor of each state should be allowed to review and approve any lease sale of coal under the public body provisions to a public body from another state.

THE CHEROKEE & PITTSBURG COAL AND MINING COMPANY 80 EAST JACKSON BOULEVARD, CHICAGO, ILLINOIS 60604 • PHONE 312/427-4900
A SANTA FE INDUSTRIES COMPANY

February 9, 1979

Office of Coal Management (140)
Bureau of Land Management
Department of the Interior
Eighteenth and C Streets, N.W.
Washington, D.C. 20240

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Re: Comments on the Federal Coal Management Program, Draft Environmental Statement

Gentlemen:

Santa Fe Mining Company ("Santa Fe", formerly The Cherokee & Pittsburg Coal and Mining Company) offers the following comments regarding the Department of the Interior's Draft Environmental Statement [DES] on its proposed federal coal management program.

Santa Fe has been actively involved in the development of western coal reserves for the past several years and seeks to bring additional coal reserves into the market. The source of Santa Fe's reserves has been the holdings of an affiliated company which is the successor in interest to several million acres of railroad grant lands in Arizona and New Mexico. The affiliate currently retains fee simple title to only 150,000 acres and title to the mineral estate in 4,000,000 additional acres of the original grant.

Most of the affiliate's present and potential coal reserves are interspersed with federal, state, Indian and privately-owned lands and coal in the familiar checkerboard ownership patterns which characterize railroad land grant areas in the Western United States. A drilling program is currently underway to identify other coal prospects among Santa Fe's holdings.

With that background, we turn to our specific comments on the DES.

Santa Fe generally endorses the Department's preferred alternative as best designed to enable the Secretary to exercise maximum flexibility to determine when, where, in what quantity and to whom federal coal should be made available through additional leasing to meet regional or national market demands. Our endorsement assumes that the Secretary's rejection of the EMARS program does not mean that the BLM still will not seek maximum input from the coal industry, as well as other segments of the public, in reaching leasing decisions. We understand from statements made by Mr. Stephen Quarles, Director of the Office of Coal Leasing Policy, in his role as chairman of the hearing panel that presided at the Washington hearings on the DES on February 6, 1979, that there is no intent to exclude or minimize industry contributions to the entire coal management program. That should be made abundantly clear in the final environmental statement.

With respect to the various planning stages leading to a lease sale, (Fig. 3-1), there should be timetables projected for each identifiable step so that the total timetable could be incorporated into a development schedule for potential lease applicants, particularly for relatively new entrants such as Santa Fe. These timetables should then be further broken down to apply to the detailed process steps defined in Figs. 3-2, 3-3 and 3-4.

On page 3-18, Col. 1, the DES describes proposed planning rules and regulations by both the Forest Service and the BLM. However, there is no discussion of how the two agencies will coordinate activities, or which agency will prevail in the event of conflict. There should be specific discussion of the Department of Interior's plans to avoid stalemates in areas of multiple agency control.

Section 3.2.2.1 - Tract Identification and Industry Expression of Interest, discusses the designation of coal tracts for lease based on factors including technical coal data. In the absence of prospecting permits, there would be a lack of complete reserve data. Section 3.2.2.2 - Regional Tract Ranking, Selection, and Scheduling, also discusses the possibility of this

technical data insufficiency, but does not propose positive action to remedy the problem.

The lack of sufficient technical data could be remedied by a means of awarding prospecting permits to Industry operators, thereby permitting more meaningful tract recommendations to be submitted.

Santa Fe's principal concern is with the DES's treatment of mixed ownership areas, particularly the so-called "checkerboard" areas in Arizona and New Mexico which contain most of the coal owned by Santa Fe and its affiliates. The historical reason for the checkerboard areas is recognized in the DES (p. 1-7):

> "Another factor of some importance is that Congress granted extensive lands to railroads in the West. To settle the West, the building of railroads was essential. But to build a railroad was a costly venture, and railroad companies would not build railroads in what was then virtual wilderness without financial inducement. The grant of land by the government to the company was that inducement.
>
> Typically, Congress granted the railroads the odd-numbered sections on both sides of the proposed railroad right-of-way extending back from the right-of-way some 10 or 20 miles on each side of the railroad. The even-numbered sections, which were not conveyed to the railroad, continued to be in the public domain. By granting to the railroad the odd-numbered sections, and retaining the even-numbered sections, a checkerboard effect resulted. Although Congress probably expected that

> the granted land would be sold by the railroads to other citizens, much of the acreage has been retained by the original grantees. The resulting checkerboard land patterns and their effect on coal development continue to influence western coal development, particularly in areas of Montana, Wyoming, and New Mexico." (Emphasis added).

The underscored statement may leave the impression that Santa Fe's affiliate has not disposed of most of its original grant land, which is not the case. As we indicate at the outset of these comments, of the many millions of acres of original railroad grant lands held by Santa Fe's affiliate, that company currently retains title to only about 150,000 acres in fee and some 4 million acres of mineral interests reserved when the surface was disposed of. The retention of these mineral interests was identical with the historic practice of the Federal Government in not disposing of mineral lands for settlement purposes and reserving the minerals in lands where the surface was disposed of for agricultural purposes, as under the Stockraising Homestead Act. The Federal Government currently holds reserved mineral interests in over 62 million acres of land in which it has disposed of the surface. 1/

The DES includes salutory recognition of the fact that the development of large tracts of non-federal coal in checkerboard areas is vitally dependent on the availability of relatively small areas of intermingled federal coal. The DES states (p. 2-51):

> "Besides helping to meet national energy objectives, new Federal leasing is needed to ensure that future western coal development is carried out as efficiently and with as little damage to the physical and human environment as possible. Because

1/ One Third of the Nation's Land: The Report of the Public Land Law Review Commission 137 (1970).

> of the large Federal ownership of western coal, a major expansion of western production without the availability of Federal coal, even if it were possible, would result in a distorted pattern of coal development, almost certainly a less efficient and environmentally satisfactory one. In many cases, the key consideration in mine site selection would become the ability to avoid the need for Federal coal, rather than the basic economic and environmental desirability of the site.
>
> In many areas, patterns of land and mineral ownership caused by early settlement policies have created a complex division of ownership and jurisdiction, with tracts of Federal coal interspersed with private, state, and Indian coal. Because individual tracts are often not large enough to justify investments, development opportunities for non-Federal coal in many of these areas would be limited unless adjacent Federal coal would also be mined. These ownership patterns add to uncertainties about production potentials, because theoretical production of much non-Federal coal may not in fact be achievable without development of Federal coal, and, conversely, a decision favoring the leasing and development of specific amounts of Federal coal may in fact lead to production of greater non-Federal reserves."

However, this recognition may be diluted by what appear to be erroneous factual assertions about the need for federal leasing in those areas in New Mexico where Santa Fe's known coal reserves are located. We cannot agree that the "San

Juan River Coal Region appears somewhat less dependent on new federal leasing because of the presence of Indian Coal and some substantial blocks of developable non-Federal coal" (p. 2-48). On the contrary, Santa Fe's remaining unleased known reserves can only be developed in the most economically efficient and environmentally acceptable fashion if certain intermingled or adjacent federal tracts are made available for leasing. Consequently, Santa Fe respectfully requests that the data underlying the conclusions as to the need for federal leasing in the San Juan Basin checkerboard areas be carefully re-examined.

Santa Fe emphatically rejects the "subalternative" of "not leasing in checkerboard areas" (4-136). The DES presents no practical justification for such a policy. There is seldom, if ever, any rational basis for arbitrary, rigid policy absolutes in resource development. The potential adverse economic and environmental consequences of the "no checkerboard leasing" are particularly pernicious. The DES recognizes that the economic impact of such a policy would simply be to "forestall development of the coal land in both the Federal and non-Federal portions of the checkerboard areas where the federal coal is now unleased" (5436). Inevitably that will be the practical result if development of the non-federal coal is attempted without the federal coal. Also, there will be serious economic and environmental costs. Although the report states that the environmental consequences of this subalternative "are difficult to estimate" and "not clear" (5-136), Santa Fe believes it obvious that the environmental consequences will be significantly adverse and unnecessary. If the policy of the Federal Coal Management Program is to diligently develop federal coal, the program cannot arbitrarily exclude development of coal in checkerboard areas. The "no checkerboard leasing" alternative should be rejected as a program-wide policy.

In its discussion of the checkerboard areas the DES also states that certain advantages accrue to the non-federal coal owners vis-a-vis other applicants in a competitive lease sale, a problem that it recognizes "is minimized where the mineral owner is willing to share resource information with others" (5-134). Santa Fe has previously made it clear to the Department that it is willing to share its coal reserve information with the Department on a confidential basis (if other lease applicants will do the same) and that it would

be amenable to granting access to its properties to the Department for testing purposes.

The analysis of the "no checkerboard leasing" subalternative also refers to the May 1978 report of the Justice Department on "Competition in the Coal Industry" and its recommendation that the Secretary take steps to insure "that the railroad's control of these [checkerboard] lands will not have anticompetitive effects" (5-136). Santa Fe wants to record its strong condemnation of the Justice Department's specious and superficial treatment of the role of railroad-affiliated coal companies in the coal industry. The coal lands owned by Santa Fe are not controlled by The Atchison, Topeka and Santa Fe Railway Company. Santa Fe is an eager, aggressive new entrant into the United States' coal market and is determined to become a competitive force in the western coal fields. Santa Fe intends to file a detailed rebuttal to the Justice Department's study with Assistant Attorney General (Antitrust) John Shenefeld in the near future requesting that the Department (1) correct the factual errors and biased, mistaken assumptions and analyses which permeate that report and (2) reconsider its recommendations in light of the information and policy arguments that Santa Fe will present. Santa Fe will also send a copy of its rebuttal comments to the Secretary of the Interior. Accordingly, Santa Fe respectfully requests that the Justice Department report's treatment of railroad-affiliated coal companies be given no credence for leasing policy decisions until Santa Fe has made its presentation to both Justice and Interior.

In conclusion, Santa Fe urges the Office of Coal Management to implement these recommendations in making a prompt final decision on reinstituting a Federal Coal Management Program. Santa Fe believes these recommendations will promote the goals of domestic self-sufficiency in energy as expressed in the National Energy Policy.

Sincerely,

R. T. Zitting

R. T. Zitting
President

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[illegible]

DAVID BROWER, *President*

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COMMENTS

ON

DRAFT ENVIRONMENTAL STATEMENT
FEDERAL COAL MANAGEMENT PROGRAM

BY

FRIENDS OF THE EARTH

DAVID C. MASSELLI
ENERGY POLICY DIRECTOR

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13 FEBRUARY 1979

Committed to the preservation, restoration, and rational use of the ecosphere

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V. COMMENTS ON THE EXAMPLE REGULATIONS 69

Friends of the Earth, Inc., a national environmental organization committed to the preservation, restoration, and rational use of the Earth and its natural resources, respectfully submits these comments and requests that they be entered in the record on the following:

(1) The Draft Environmental Statement (DES) on the proposed Federal Coal Management Program, and the program and example regulations described therein,

(2) Proposed lands unsuitable criteria as described in 43 FR 57662, and

(3) Proposed Planning Regulations under the Federal Land Policy and Management Act (FLPMA) as described in 43 FR 58764.

We will submit further comments on the proposed planning regulations prior to April 1. These written comments will expand upon previous written and oral comments made at hearings in Washington, D.C. and various regions impacted by the proposed program.

I. INTRODUCTION

The Draft Environmental Statement outlines the history of the Federal coal program (DES 1-7 - 1-14). During this entire period, the Department of the Interior administered a coal leasing program, not a coal management program. It resulted in the haphazd leasing of billion of tons of coal at less than fair market value, with little energy production and a significant adverse environmental impact.

The preparation of a programmatic impact statement on the Federal Coal Management Program is a significant step in the institution and establishment of a rational and orderly Federal policy concerning the leasing of coal and its effects on other land use values.

Some 25 million acres in six Western states will be directly affected by the proposal -- they contain lands which will be eligible for consideration for future leasing. In addition, vast areas of Federal non-coal lands, Indian lands, State lands and private land will be profoundly affected by the

Program. Decisions made by the Department in its implementation of the coal management program will determine the location and size of population centers, traffic flows, the quality of air and water, the location of certain industries, the viability of Western farming and ranching, and the type of lifestyle enjoyed throughout the six state region and beyond.

During the past seven years, the Department has been effectively out of the coal leasing business. However, the coal industry has managed to grow, particularly in the West, without any appreciable problems. It is feasible -- though not necessarily desireable -- to meet all but the most optimistic foreseeable coal demands with resources on private, State, and Indian lands, as well as from Federal leases outstanding and PRLA's.

The same time span has seen the imposition of legal planning requirements on the Department. The Federal Land Policy and Management Act of 1976 established a land use planning system for the public lands administered by the Department. These FLPMA land use plans will gradually supercede the oft-discredited Management Framework Plans developed by the Department in the late 60's and early 70's.

At the moment, the Department's land use planning program and its coal management program seem to be on a collision course. In order to get its coal management program off the ground in time for a 1980 lease sale, the Department is proposing short-cuts in the land use planning process.

The environmental analysis of the Department's proposed program raises many issues -- a good number of which we comment on below. But the central issue raised in the Draft ES and the major issue facing the Department is the decision it must make between rapid implementation of coal leasing and its land planning responsibilities.

Departmental Coal Management Goals

The Department proposes four goals to govern the development of its coal management program. For the most part, we would agree with these goals. (3.1.1). However, they should emphasize consultation and cooperation with the public, not just with state governments. The importance of meaningful public involvement is not just a necessary part of any good administrative practice, but is also embodied in the principles and instructions of the Federal Land Policy and Management Act, e.g., sections 102, 202, 204, etc., and the Federal Coal Leasing Amendments Act, e.g., section 2. As such, the principles governing the program should explicitly mention public involvement.

Also, an acceptance of the objectives of the National Energy Plan can not be made without qualifications. While we supported the aims of the plan as proposed by the President in April 1977, several elements crucial to the program--particularly several energy conservation measures--have not yet been enacted. To the extent the the "National Energy Plan" referred to in the second Departmental goal either establishes an arbitrary coal production target or does not include vigorous and effective enforcement of energy conservation goals originally proposed, we cannot accept it as the basis for a coal management program. Therefore, we would propose that the second coal management goal read:

> "Assure that sufficient quantities of Federal coal are produced to meet the demand for such coal under conditions of maximum implementation of cost-effective energy conservation measures."

Likewise, the fourth goal should read:

> "Include consultation and cooperation with state governments and the public in planning the management of Federal coal."

Unfortunately, the Department cannot meet even the goals as it has defined them. Coal policy outruns resource planning. Coal decisions dominate resource decisions. The Department has and plans to continue to short-circuit the most important environmental protection activities included in its proposed program.

We support the goals stated by the Department with the changes suggested above. We feel the Department can better meet those goals.

Reasons vs. the "need" for New Federal Coal Leasing

The DES correctly states that "The failure of the Department to show the need for leasing was cited by the court in NRDC v. Hughes as a principal defect in the previous coal leasing programmatic environmental impact statement." However, the response by the DES to correct this deficiency is less than adequate. Not only is the Department's analysis of coal demand and supply inadequate--an issue we evaluate in detail below--but it attempts to justify the adoption of the program on the basis of undocumented and speculative "benefits" which have nothing to do with the determination of need for new competitive leasing. Judge Pratt was very clear in asking "whether the proposed policy is even necessary" based upon reserve, demand, and production statistics, not on factors such as competition, administrative convenience, or presumed better patterns of development. We feel it is unfortunate if the Department's views correspond to those of Mr. Bob Uram, who is quoted in the Grand Junction Sentinel (1-6-79) as stating "I don't think the department has to be able to demonstrate need to lease coal. . .If the department thinks it has better land that can be developed more than private land--you can think of a lot of reasons in the public interest to lease." Unfortunately the DES shares this point of view in section 2.8.

It is essential to separate two questions. One asks whether various factors such as competition and environmental protection require the need for a particular form of resource management policy or another. The other question--the one asked by the court in NRDC v. Hughes--asks whether, on the basis of supply and demand considerations, there is a need to resume leasing. If the DES were to fully separate these two questions, we would have no complaint. Indeed, we believe that environmental protection and recent law enacted for that purpose both require a resource management policy in which coal management decisions must take place. However, the DES confuses the questions after failing, we believe, to definitively address demand and supply.

Even if the Department were correct in its legal interpretation, we

have not been convinced by its argument.

The department's argument that new leasing is required for legal and administrative purposes rests mainly on the legal requirement to process outstanding PRLAs. This, however, does not require the resumption of competitive leasing. It does lead to a need for a process to manage the issue of preference right leases. Unfortunately, the preferred alternative is relatively short on specification of PRLA management considerations.

The department also proposes that new leasing is necessary to promote desirable patterns of coal development. This argument assumes that private coal development patterns will be undesirable, a premise unsupported by any evidence in the DES. It also denigrates existing federal and state efforts to control and regulate the effects of development on private land, contradicting assumptions in Chapter Five of the DES that such regulation will adequately mitigate environmental and other impacts. The analysis in chapter five, as we will discuss below, fails to compare the preferred alternative with other alternatives, including maximum private land development, to confirm whether it will, in fact, lead to more desirable coal development patterns.

Finally, the DES proposes that new leasing will improve competition. We do not believe that the department or the Justice Department's 1978 study cited by the DES supports this conclusion. The Justice Department's analysis was largely based upon its comparison of 4-firm concentration ratios* for control of coal reserves between "total reserves," which includes unleased federal land and "uncommitted non-federal reserves," which includes existing leases and private fee lands, in the Southwest and Northern Plains.

Concentration Ratios	Northern Plains		Southwest	
	4-firm	8-firm	4-firm	8-firm
Total coal Reserves	14.3	22.1	29.7	39.8
Uncommitted non-federal including existing leases	46.9	70.2	66.3	90.6

Source: Department of Justice, Competition in the Coal Industry, May 1978 p. 63

* Concentration ratio is a measure of competition; the lower the ratio, the greater the competition--in this case, the competition for coal reserves or production.

Justice suggested that there was an arithmetic possibility of decreasing the 4-firm and 8-firm concentration ratios in non-federal reserves by leasing additional federal reserves. This is a theoretical possibility. However, it ignores the entire history of the leasing program. The high concentration ratios resulted in part from the federal leasing program prior to 1971. The 4-firm concentration ratio for ownership of federal leases (on an acreage basis) is 27.0%[1], compared to a combined 16.1% 4-firm concentration ratio for all Northern Plains and Southwestern total coal reserves, and compared to a national concentration ratio of 13.3%. Although acreage is not exactly comparable to tonnage reserve figures, it is noteworthy that the competitiveness of existing federal leases does not approach the theoretical limits which are the basis of Justice Department recommendations. Moreover, Department of Justice figures also indicate that 4-firm concentration ratios for national coal production increased during the period of federal coal leasing between 1950 and 1970, but decreased since the imposition of the leasing moratorium in 1971.[2] Similarly, production concentration in the west far exceeds the concentration in the eastern coal producing regions. (Dept Justice p. 63). The General Accounting Office found that changes in production concentration of coal were more closely related to general economic changes than they were to ownership patterns. (GAO, II-5). One additional argument supported Justice's recommendation of increased leasing to promote competition. That was its survey of coal producers, coal consuming electric utilities, and utility commissions in the Southwest, hardly an unbiased basis for a federal coal management policy.

The overwhelming evidence is that federal leasing prior to the present has been entirely uncompetitive, leading to low bonus bids and ultimately Congressional reform. Moreover, the fundamental conclusion of the Justice Department was that regional coal markets "are workably competitive." To justify a coal management program on this analysis, which furthermore ignored the history and nature of leasing activity, is unreasonable.

1/ Based on Council on Economic Priorities, Mine Control, Table 1-13, p. 37
2/ GAO, "The State of Competition in the Coal Industry," p. II-6, 1977

II. THE NEED FOR FUTURE FEDERAL LEASING

Chapter Two of the Draft ES, "The National Energy Role of Western and Federal Coal," addresses the question of need for a Federal coal leasing program. As the ES notes, this is a central issue, "The failure of the Department to show the need for leasing was cited by the court in NRDC v Hughes as a principle defect in the previous coal leasing programmatic environmental impact statement." (DES, 2-43)

Resumed leasing under the preferred alternative is justfied by the Department primarily as a means to "give the Nation greater assurance of being able to meet its national energy objectives." (DES, 2-43) To be sure, three other possible benefits from the resumption of a new Federal program are also mentioned: the promotion of more desireable patterns of coal development, providing additional legal and administrative flexibility to handle problems which will arise in any event with PRLA'S and existing leases, and to increase competition. However, these three areas are given only cursory treatment in the Draft ES. They are discussed in less than two and one-half pages, no supporting data is produced, nor is there any analysis of alternative ways to achieve these goals without new leasing.* In the final analysis, the Department basis its justification for adopting a new coal leasing program on the perceived future need for vast amounts of Federal coal.

We do not question the need for a new Federal coal management program At issue is the kind of program to be instituted. An appropriate program must

* For example, the Draft avers that competition in the coal industry is a problem, relying on a memorandum from the Department of Justice, and suggests that new leasing may alleviate the problem. There is no mention of the Sherman and Clayton Acts, nor the authority of DoJ, the FTC, FERC or state regulatory agencies (assuming that most anticompetitive effects are manifested in the sale of coal for utility use) to respond to this alleged problem.

be responsive to the real needs for future coal development, not imagined or miscalculated needs. For this reason the discussion of the role of Western and Federal coal in the Draft ES is of crucial importance. The methodology on which this discussion is based becomes a matter of concern and seemingly arcane considerations of modeling theory attain some importance because they have an impact on the picture of the future adopted by the Department in developing its program.

Projections of coal supply and demand play a critical role in the development of a coal leasing program. If properly done, they can help provide answers to four questions: Whether to lease at all? Where to lease? What magnitude of leasing to undertake? When to lease?

Without too much oversimplification, the projections adopted by the Draft ES give the following answers. Leasing must be undertaken. The bulk of the leasing must be in the Powder River Basin Region. Immense amounts of leasing are needed (By 1990, the Northern Great Plains Region might have to produce more coal than is currently mined in the entire country). And, due primarily to the magnitude of the projected need, the leasing must commence as soon as possible.

The implicit conclusion of the DES on the questions of magnitude and timing of coal leasing pose the greatest threat to the rational and orderly planning process mandated by the Federal Land Policy and Management Act. The prospect of overwhelming need, particularly as set forth in the "1990 High" scenario, is used by the Department to justify the steps it has or soon will take to shortcut the FLPMA planning process, to continue relying on existing MFP's as the base for coal use planning and to further reduce its commitment to immediate identification of Areas of Critical Environmental Concern.

Because of these consequences, some of which are already occurring during the comment period on the Draft ES, it is necessary to subject the supply and demand projections used in the DES to the greatest possible scrutiny. Our analysis indicates that the numbers generated by the Department of Energy in "Federal Coal Leasing and 1985 and 1990 Regional Coal Production Foracasts" and subsequently adopted in the Draft ES are simply wrong. They do not provide a reasonable basis for decision making. They use a methodolgy which consistently overstates the demand for Western coal. They are inconsistent with later projections using the same model. At a minimum, the DES must be supplemented with an adequate analysis of coal supply and demand before any final action is taken.

DOE Supply and Demand Figures

There is an aphorism in the forecasting business that while there are no magic numbers, numbers are magic. They give a false sense of precision and provide a decision maker with an easy handle on difficult issues. All documentary presentations of energy forecasts are hedged about with qualifying statemetns which indicate that the forecasts are basically worthless. (See DES, 2-47) Needless to say, these hortatory cautions which are always trotted out when projections are attacked, do not prevent the affected decision makers from relying on the numbers in question. If attacked on the validity of the projections, they say "Well, we said right there in the document that it wasn't perfect," rather than correcting the errors. Then they go right along using the wrong numbers.

There are several severe problems with the coal supply and demand projections developed for the Draft ES by the Department of Energy. The model inherently overstates both energy demand and supply. The National

Coal Model used by DOE also appears to significantly overstate the demand for Western coal as a portion of total coal demand. In addition, the particular iteration of the model used for the Draft ES contains unrealistic assumptions which skew the projections towards even higher coal demand. These three characteristics of the DOE projection effort inevitably lead to forecasts of higher Western coal demand than are credible.

The first step in the development f the DOE projections was the use of the Project Independence Evaluation System (PIES model) to provide forecasts of the domestic energy system in 1985 and 1990. The PIES model has been subject to a good deal of criticism. PIES is a demand-based equilibrium model. In plain English, this means that the PIES routine first establishes a likely level of sectoral energy demand — based on a general macroeconomic projection (in this case the DRI TRENDLONG model) — and proceeds to meet that demand. The fact that the projected supply can't or won't be forthcoming is of little consequence to the model*; if there is a demand, there will be a supply.

Although the Draft ES notes that there are alternatives to "traditional modeling of the energy sector of the economy, as reflected in the DOE coal model," (DES, 2-25) citing to a California study which projects energy consumption based on a detailed survey of households, businesses and institutions, it does not choose to use such methods. (The California study, incidentally, utilized for future end-use energy planning in "P. Craig et. al., Distributed Energy Systems in California's Future: Interim Report, 2 volumes, HCP-P7405-01/02, U.S.

* A classic example of this can be seen in the continued propensity of all DOE models, including this one, to project a thriving synthetic fuels industry by 1985. Thus, the DOE forecast projects between 7 and 27 full-sized plants by 1985 and 17 to 85 plants by 1990. Given lead times, financing and other considerations, these projections are absurd — there may be one plant (ANR in Mercer County) — but because the demand exists, the supply is created, on paper.

Department of Energy, 1978"). Nor does it choose to discuss the plans inherent in traditional econometric models.

The major flaw in the PIES model is that it consistently overstates energy demand. In 1974, the Energy Research and Development Administration predicted that primary energy demand in the year 2000 would be 140 quadrillion BTU's, an increase of 220% in 26 years. In 1976, the ERDA forecast had been reduced to 124 Quads. By 1978, the Energy Information Agency, which had taken over that ERDA function, was forecasting between 100-110 Quads for the year 1990 and had given up forecasting for the year 2000 altogether. In each instance, the PIES-based forecasts utilized by the nation's chief energy agency had been reduced after a broad concerns was developed that the demand forecasts were too great.

In an interesting display, Amory Lovins has shown how government projections of energy demand have increasingly declined as we give more information about the ways in which energy is used. (SEE TABLE ON NEXT PAGE)

Lovins indicates several areas in which long-term econometric equilibrium models like PIES may be in error:

"Price elasticity of demand.--Many analyses minimize or ignore the effect of higher cost--especially for new facilities--on demand, or consider only the short-term component of price elasticity.

"Inverse price elasticity of demand.--Many projections are based on periods in which real energy prices fell: for example, the average real price of U.S. residential electricity fell fivefold during 1940-1970. Apart from short-term fluctuations, this seems unlikely to recur, since in most energy systems, marginal costs have exceeded historic costs since about 1970.

"Saturations.--Many traditional growth markets may be constrained by physical saturations. The UK has until recently assumed that space-heating demand is a linear function of income, but the rich may not wish to roast. Car traffic is

EVOLUTION OF APPROXIMATE FORECASTS
OF U.S. PRIMARY ENERGY DEMAND IN
THE YEAR 2000 (q/y = 10^{15} BTU/y ~ EJ/y)

(1972-8 RATE: CA. 75 q/y)

YEAR OF FORECAST	SOURCE OF FORECAST			
	BEYOND THE PALE	HERESY	CONVENTIONAL WISDOM	SUPERSTITION
1972	125 Lovins	140 Sierra Club	160 AEC	190 BuMines, FPC
1974	100 EPP (ZEG)	124 EPP (TF)	140 ERDA	160 EEI, EPRI
1976	75 Lovins	89 - 95 von Hippel / Lovins & Williams / For.Aff.	124 ERDA	140 EEI
1978	33 Steinhart (for 2050)	63 - 77 CONAES Cons. & Dem. / IEA Panel (for 2010) (I) (II)	96 - 101 / (Weinberg) (III)	124 Lapp

(Note that this matrix has considerable predictive power. For example, DOE's September 1978 Domestic Policy Review forecasts for 2000 were 95 q with $32/bbl oil--squarely in the "conventional wisdom" box and identical to Lovins's Foreign Affairs number two years earlier--and 114 and 132 q for $25/bbl and $18/bbl oil respectively, averaging to 123 q and belonging in the "superstition" column, since such low prices presumably require supernatural aid.)

Source: Amory B. Lovins, "Is Nuclear Power Necessary?" Groupe de Bellerive Colloquium, "Nuclear Energy--Implications for Society," Geneva, 1979

"Promotion.--In most countries, rapid demand growth, especially in such fuel-intensive sectors as electric-resistance space heating, have been heavily promoted by advertising, special rates, etc., now mostly being reversed.

"Distortions in basic data.--Many studies rely on outdated and excessive estimates of population, labor force, labor productivity, and other factors underlying projections of economic activity. Some countries have unique distortions: for example, the US annual energy growth rate in the 1960's was inflated one or two percentage points by the Vietnam war leading to an enormous error if extrapolated for several more decades.

"Definitions.--Most projections are made in terms of primary energy. But with the commonly assumed shift towards electrification and synthetic fuels, more than half of the officially projected growth in the next few decades (for example, in the U.S., Germany, France, and the UK) will go to conversion and distribution losses, thus masking much slower growth in final consumption or "end-use energy". Failure to forecast in end-use terms often leads to significant distortions.

"Subsidies.--The most recent and central question to be raised is how far past, present, and projected energy use might be inflated by the pervasive public subsidies to the energy system rather than reflecting true internal cost. Recent studies in the U.S.--the only country, to my knowledge, in which decent studies of energy subsidies are publicly available--have revealed that the tax and price subsidies are currently of order $10[11] per year, not including large historic subsidies. These subsidies are also unevenly distributed between various forms of energy, leading to further distortions.

"These arguments are all important, but tend, at least in the short run, to be inconclusive owing to the infinite speculative combinations one can assume for future levels and rates of change of the many key parameters--amount and composition of economic activity, prices, price elasticities, income and cross-elasticities, etc.

While it is clear from the literature that most classical projections of growth near historic rates can be economically justified only by assuming dramatic decreases in real energy price, many analysts are coming to prefer a more concrete mode of argument that cuts more quickly to the heart of the matter: physical analysis of potential efficiency improvements (tested for their economic attractiveness) combined with physical construction of end-use needs "from the bottom up". Such an explicit and disaggregated treatment requires the analyst to take responsibility for saying just what the energy will be used for. This type of analysis has the virtues of being simple, transparent, scrutable and ratproof."

Lovins then summarizes a series of examples which indicate the development of non-econometric energy forecasting, including the California study* almost all of which reach credible results that imply significantly less energy usage than occurs under traditional econometric modeling. The point here is not that the Department must undertake such forecasting--though that would certainly be desirable--but that the Draft ES should display an awareness that the PIES results will most likely overstate energy demand.

The DOE projections are developed from the base demand figures supplied by the PIES model through two routines designed to indicate industrial and utility demand for coal.

The "EEA model" (for Energy Environmental Analyses, Inc.) is used to determine the industrial demand, by type, for coal. Precious little documentation or explanation of the EEA model is provided in either the Draft ES or the LPDO study, so it is difficult to criticize. However, it is implied that the equilibrium price of natural gas is an important factor--the model's "building" a population of industrial combustors. (LPDO, p. 42) As will be discussed below, the values for future natural gas prices used in the model were wrong.

* In addition to the California Energy Commission, the National Research Council Committee on Nuclear and Alternative Energy Sources (CONAES), Panel on Energy Demand and Conservation, the Oak Ridge National Laboratory Energy Division, and the Energy Conservation team at Lawrence Berkeley Laboratories have all developed national and reional end-use forecasting models.

THE ICF MODEL

The critical third step in the DOE projection was the development of utility demand estimates and final industrial demand figures using the ICF Coal and Electric Utilities Model. As the LPDO states "The basic ICF model structure is conceptually straight-forward in that a supply component via a transportation network provides coal to satisfy the demand for both utility and nonutility consumption at least cost." (LPDO, pp. 44,45) ICF is probably a state-of-the-model, but it does have its flaws, which are highly relevant to the questions the Department was to address in the "new" section of the Draft ES.

The ICF model overestimates Western coal demand. Some reasons for this will be given below but there can be no doubt that the overestimation is a salient feature of the model. When compared with models developed by Argonne National Laboratory and the Stanford Research Institute, the ICF model consistently projects greater Western coal usage--even when all three models are in remarkeable agreement on total national coal demand (Argonne National Labs, NSPS Project Reports, #5 "Impacts of NSPS Revision on Regional Coal Production", #4 "The Effect of Alternative New Source Performance Standards on Regional Production of Coal").

In a situation where there is disagreement among forecasters, the temptation is to say "A plague on all your houses" or to wonder how to differentiate among them. However, in this instance, there is almost complete agreement that the ICF model has been seriously in error--at least in the shorter time from where some certainty is possible. Referring to a late 1977 ICF estimate of coal demand, Argonne Report #4 states:

> "The ICF production estimate for the Northern Great Plains (424 million tons/year) is the highest I have seen or heard of. The 1976 production in the Northern Great Plains was just over 68 million tons. I find it very difficult to believe that production could expand by a factor of six in just nine years. The feasibility of such a dramatic increase can be questioned because:
>
> 1. The U.S.G.S. has estimated that the maximum production from current Federal leases (further leasing has been indefinitely suspended) will be less than 200 million tons by 1985. It is doubtful that the 20-25% of coal reserves in non-federal lands could, by itself, support even an additional 75 million tons of production.
>
> 2. The most recent FPC information on utility demand for Northern Great Plains coal shows only 150 million tons of contracted demand between now and 1986 for newly constructed power plants.
>
> 3. "Planned" mine openings reported in the Keystone survey for the Northern Great Plains are about 307 million tons, far less than those needed to achieve the ICF production forecast. In fact, total western mine openings as reported to Keystone amount to only 487 million tons/year by 1985. Moreover, it should be emphasized that the Keystone data includes mines that are not under active development. Given the 8-10 year development time for a new mine, it represents an upper ceiling on Western mine capacity.
>
> Without further details on the regional markets, this production is intended to serve, it is impossible to comment on the likelihood of a demand existing for over 400 million tons by 1985."

LEAST COST METHODOLOGY

One cause for the tendency of the ICF model to overestimate Western coal demand, particularly surface coal demand may be found in its use of a least cost method to determine future mine sites.

The least cost nature of the model skews the location of mining and the method of mining. The model examines all possible supply options and chooses the least costly alternative. Miniscule price differences dominate environmental, social and other considerations. One result of this is the absence of underground mining

as a future source of supply. The June DOE projections, drawing on the methodology developed in Western Coal: Promise or Problem by Tyner and Kalter, consign underground mining to the wastebin, even when plans exist to mine the coal.

Two examples from the DES show the underestimation of the potential for underground mining. Table 2-29 shows 47.2 million tons of planned production from the Uinta-Southwestern Utah Coal Region by 1985, plus an additional 23.3 million tons from mines without mining plans for a total of 70.5 million tons of production by 1985. The DOE projections show a high demand of 26.3 million tons. We assume that somebody must want that extra 43.7 million tons of coal and that the companies spending hard cash to develop it have not taken leave of their senses.

In Table 2-30, which summarizes planned, potential and projected production for the year 1990, the DES shows a maximum potential production of 509.8 million tons per year (the DOE projections are 366.5, low; 659.7 medium; and 922.1, high). The DES draws the following conclusion:

> For 1990, there could be some, but probably not a large need for new leasing to reach low projected production levels. On the other hand, achievement of medium and high 1990 production levels would require extensive development of new sources of western coal production, especially in the Powder River, Green River-Hams Fork, and San Juan River Coal Regions.

This conclusion might be more meaningful had not Table 2-30 totally ignored the 160.4 million tons a year potential underground production from preference right leases it set forth in Table 2-23. With this potential added, the maximum potential from existing leases--now 670.2 million tons a year--becomes essentially equivalent with the 1990 medium demand. Such equivalence would not necessarily eliminate the need for more Federal coal leasing, but it certainly would have an effect on the magnitude, timing and location.

Underground mining is undoubtedly somewhat more expensive than surface mining. It is an open question whether that additional cost can be justified by social and environmental factors. A model which makes no allowance for the possibility that one might wish to chose slightly more expensive mining methods, as a matter of public policy, is seriously deficient as a basis for decision-making.

ASSUMPTIONS ABOUT FEDERAL LEASING

One final area in which the DOE model contains an inherent flaw is its assumption that the cheapest federal land would be leased. Just which land will be leased, of course, is precisely what is at issue in the Draft ES. The LPDO states:

> "For all three scenarios in both 1985 and 1990, it was assumed that the federal government would lease enough coal reserves such that the reserves cheapest to mine (regardless of ownership) would be mined first. This assumption has the effect of minimizing total national costs of coal production, transportation, and consumption." (LPDO, p. 102)

By lowering the cost of Western coal, this assumption inflates demand. The inflated demand creates the need for an inflated supply to be met by the lowest-cost Western coal, e.g. Powder River surface coal.

EXOGENOUS ASSUMPTIONS IN THE DOE MODEL

The inherent flaws in the DOE model give rise to serious doubts concerning its fitness as a tool for decision-making. These problems are compounded by the choice of assumptions and inputs employed in the particular iteration of the DOE model adopted in the Draft ES.

In large part, the assumptions are faulty because of a timing problem. The DOE projections were developed last spring, prior to passage of the National Energy Act. They contain some guesses about the ultimate shape of that legislation that proved to be wrong. In addition, the spring run also attempted to guess at the results of other important regulatory processes, most notably the New

Source Performance Standards for Coal Fired Power Plants, again, with what appears to be little success.

Many of the flaws could easily be corrected if only the Department will attempt a further iteration of the DOE model latter this year, when these critical variables about which guesses were made will be known exactly. The mad dash for a final decision by June 1 should give way to a moment of lucidity. There is no sense in having the Secretary make a decision based on data which is wrong, when a few months of delay will give the Department a chance to do it right--for once.

A brief look at the eleven exogenous variables used in the PIES-NCM run shows a host of errors. Most, although not all, lead to higher coal demand and supply figures.

(1) Crude Oil Prices.--the 1985 low ($13/bbl in 1975 prices) has clearly been superseded by the December price rise.

(2) Natural Gas Prices.--all scenarios are wrong for both 1985 and 1990. Low scenarios indicated a continuation of previous regulation, medium and high had BTU equivalency with price of fuel oil. The actual natural gas price, set by legislation, is somewhere in between.

(3) Electricity Growth Rate.--the 5.8% NERC projection to 1985 is not credible in light of recent growth rate trends.

(4) Environmental Regulation (Utilities).--the percentage FGD on low sulfur coal is the most critical variable in the model. See discussion below.

(5) Coal Conversion Regulations (Utilities).--assumption of regulatory program passed by conference committee does not take into account either the stringency of the regulations promulgated by DOE or the temporary public interest exemptions for gas-fired boilers now accepted by DOE.

(6) Coal Conversion (Industry).--there is no industrial user tax.

(7) Synthetic Fuel Production.--1985 and 1990 numbers do not correlate with announced industry plans. Likelihood of any plants by 1985 is small.

(8) Local Coal.--Section 125 of the Clean Air Act is operative. It is not provided for in the model. (This was due to a pending amendment to the provision. However, while amended and changed somewhat, there remains a provision in the law.)

Many of the problems noted in this brief list could be alleviated if a new model run were attempted today, using current information about energy pricing, demand and the National Energy Act. It would, of course, take some weeks to develop appropriate programing instructions for some of the more complex variables. However, a winter re-run would not cover the single most important variable in predicting future coal use--the New Source Performance Standard.

At the outset there is some difficulty in determining just what versions of the NSPS are being used in the projections. The Table of DOE assumptions in both LPDO and the Draft ES describes the option as follows: Low "90% FGD on all new plants"; Medium "85% FGD in the East, 60% FGD on low sulfur coal"; High "same as mod-range" (LPDO, pp. 78,79, DES H-2, H-4). However, the description in the text of Air Pollution Control Regulations varied from this:

"Air Pollution Control Regulations

Best Available Control Technology(BACT) is defined as 90 percent SO_2 removal, except that partial scrubbing would be permitted if annual average SO_2 emissions were reduced to a specified floor:

Scenario	Floor (lb. SO_2/MMBtu)
Low	0.2
Mid-Range	0.5
High	0.5

(LPDO, p. 96, DES, H-6)"

An indication of the importance of the final NSPS--and of the variability of energy projections--can be seen by looking at a series of Western coal demand projections, under various assumed NSPS regimes, done on the same NCM model subsequent to the June 1978 DOE projections used in the EIS.

In "Further Analysis of Alternative New Source Performance Standards New Coal-Fired Power Plants", Preliminary Draft, September, 1978, ICF inc ated analyzed several alternative NSPS regimes under a single set of non-NSPS variables (e.g. there was no low, medium, high, just one energy demand scenario which was very close to the DOE medium). For 1990, Western coal demand varies by nearly 200 million tons per year, depending on which NSPS alternative was chosen.

September 1, 1978 Projections

Floor	Exemptions	1990 Western Coal Demand	
0.2	Y	735.2 MT/Y	
0.2	N	752	
0.5	Y	934	-- equivalent to DOE high NSPS assumption.
0.5	N	772	
0.67	Y	779	
0.8	Y	783	
	DES High	922.1	
	DES Medium	659.7	

Further forecasts, released in a subsequent preliminary draft on December 12, 1978 indicate even lower Western coal demand figures for a new array of potential NSPS options chosen by EPA, DOE and NRDC. None of these options produced a total Western coal demand in excess of 700 million tons per year in 1990.

While this assemblage of predictions and projections may seem confusing, it does show two very important things. First, NSPS alternatives have a major impact on the total Western coal demand. The particular set of NSPS alternatives included in the DOE High projection produced Western coal demand numbers significantly higher than any other NSPS outcome, even when all other variables were held constant. Second, as greater concensus on variables was achieved -- in the December 12, 1978 run, all coal demand projections decreased.

In light of this uncertainty, we strongly urge the Secretary to hold off any decision on the need to lease until after EPA has reached a final decision on the NSPS and DOE has an opportunity to analyze the coal demand impacts of that decision. A wait of no more than a few months will allow Interior to make a much sounder decision based on the right information.

SUMMARY ASSESSMENT OF THE DOE ENERGY PROJECTIONS

The coal demand and supply projections used in the DES give a set of signals on whether, where, when and how much to lease. The signals which come through in the DES are wrong, the product of inherent flaws in the DOE model and improperly determined exogenous variables.

It is easy to remedy most of these defects, if the Department wants to take the time and effort to do it. At a minimum, it should recalculate the NCM data using variables which accurately reflect the current law. To do an adequate job, however, the Department must wait until a decision has been made on the New Source Performance Standards -- the single most important variable determining the magnitude and location of Western coal demand.

These steps have an importance beyond that of rectifying some computational errors. There is no doubt in our minds that an honest and rational analysis of future coal demand will show the Department that coal leasing is not a problem requiring an immediate solution, necessitating the effective destruction of its land planning process, as well as the Powder River Basin. More dispassionate analysis will clearly show that the real coal demand can be met by leasing after a sound land use planning program, including designation of areas of critical environmental concern, is in place, not before.

The Department must take its time to properly assess the difficult issues involved in determining the need for leasing. A failure to do so will lead to the implementation of a program based on the GIGO principle well known to all energy forecasters--"garbage in, garbage out".

One other task that the Department could undertake, while ironing the kinks out of its econometric model, would be to expand on its shamefully brief discussion of "Nontraditional Energy Sources". The Draft ES devotes one paragraph to unconventional sources of natural gas, one paragraph to solar energy and three munificent paragraphs to energy conservation.

It is not necessary to adopt a millenial attitude towards these sources to realize their relevance to future demand for coal. The major projected sources for unconventional natural gas are in the geopressurized zones of the Gulf Coast and the Rocky Mountain overthrust belt. Thus, such sources are perfectly situated to service the same region which will be receiving the bulk of Western coal (Figures 5-4, 5-5 show Texas, Western Interior and Other East (the Midwest) receiving the bulk of Western coal). There is also a good transportation network already in place. No mention is made of any of these facts.

The discussion of solar energy is totally without substance. The Draft ES adopts a low estimate of solar potential. Because it has failed to evaluate the end uses of the projected coal usage, it is not possible to analyze which solar technologies might compete with which potential uses of coal in the regions served.

Finally, the evaluation of energy conservation is laughable. Western coal will be used to generate electricity and for some industrial process heat uses. These are two of the areas in which energy conservation has the greatest potential, yet the latter receives one sentence, and the former, one-four word phrase. Price

and technology--sensitive trends in electricity usage are not discussed at all, an entire literature is ignored and only one source (EIA's energy data estimates) is cited in the Draft ES for all of these sources.

This is in keeping with the tone of Chapter Two which provides a status quo, backward-looking analysis of the future. Coal has obviously replaced nuclear power in DOE's forecasting hierarchy. It will grow--regardless of competing energy sources, financial, technical, environmental and resource (including water) constraints, or a general decline--the growth of energy use--because it is programmed to grow. The fact that it is best suited to meet only two end use categories, electric generation and large scale industrial energy needs is conveniently overlooked.

COAL PRODUCTION WITHOUT NEW LEASING

A singular irony in Chapter Two is the different faces turned towards existing and future coal leases. While LPDO develops demand figures that strain credulity and surely imply some profit in mining the substance, DOE projects resigned inaction by the holders of existing leases or PRLA's—many of whom received their rights for a song.

Obviously, many of these leases will not be developed. Some can't meet SMCRA requirements, some are in the wrong place, some are too small, some just plain have poor deposits and won't even be economical. Nor is Friends of the Earth particularly anxious to see any of them developed. The leases were issued, by and large, without appropriate planning or environmental analysis. The development of many of them would constitute environmental tragedies. We will strongly support any efforts by the Department to curb their growth.

But the sad fact is that many of these leases may well be developed and it is best to know just how many so that we can limit the amount of additional land put in jeopardy to that minimum required to meet legitimate energy needs. Unfortunately, the Draft ES is woefully inadequate in its canvass of potential

development and utterly fails to provide quality data to help determine just how much coal will be mined from over three thousand existing state and Federal lands.

Let us start with the positive. The Draft ES provides summary statistics for planned production from those 223 Federal leases for which mine plans were approved or pending approval. These mines alone indicated a planned 1985 production of 308.6 million tons a year, approximately double total 1977 Western production.

The next category, existing Federal leases without approved mining plans, is subjected to analysis of a more problematic nature. To some extent, this is only appropriate. However, the methodology employed, reviews by Geological Survey mining supervisors, "taking into account demand for the coal type, environmental problems of the lease site, transportation availability, mining costs, lease size and other factors" (DES, 2-30) leaves much to be desired. Why did the Department, which has been receiving significant criticism over its handling of existing leases, not make a major effort to develop more information about these mines? Why weren't other professionals called in to assist the GS mining supervisors in assessing questions about national demand, transportation and other matters not normally within the purview of the GS? Why was there no update of the March reviews which were generally referred to in the agency as the "telephone survey"?

Without back-up data, the assigned likely production figures for existing leases without mine plans raise some interesting questions. Nearly 95% of the reserves under lease in the Powder River Basin are assessed not to be developed. This is extraordinarily high considering the generally favorable geologic and economic factors which obtain in this area. Are these leases all in alluvial valleys? Are they narrow seams, despite the fact they were generally let at

the lessees' request? Does GS have different views on the potential demand for PRBR coal than DOE, which finds that the sky is the limit? The Draft ES gives no clue.

The lack of clarity continues in the review of the 172 outstanding PRLA's. The Draft ES accurately notes the significant reserves associated with PRLA's and then does its best to discount the potential. Table 2-23 indicates a significant production potential from PRLA's without legal or environmental questions. Table 2-30 ignores all underground production from PRLA's in its "summary of planned, potential, and projected production, 1990".

Of underground reserves in PRLA's in the Powder River Basin--4.3 billion tons in the Wyoming, or richer, deposits--the Draft ES says "57 percent of PRLA reserves without legal or environmental questions are underground reserves in the Powder River Coal Region where DOE projections show no underground mining occurring." (DES 2-34) There is no explanation of why the holders of these PRLA's would shelve them, no indication that the DOE model considers the strong likelihood that these non-leased coal mines, garnered without bonus payments and subject to relatively few restrictions, might make their owners quite wealthy. Nor does the downplaying of the Powder River PRLA's square with the oft expressed fear of Department officials that they will be hit with a flood of demands to process PRLA's from Powder River as soon as the Hughes injunction is lifted.

The potential of Indian leases is similarly underestimated. In 1977, Indian coal represented nearly 13.8% of all coal mined in the West, by 1990 the Draft ES expects that figure to drop to between 2% and 5% (Table 2-30) despite the fact that Indian lands could support nearly 800 million tons a year of coal production (Table 2-24). While no one expects anything like that

amount of production, it seems inconceivable that Indian coal production will stand still. Because of the large contiguous blocks of Indian coal, which can be leased without acreage restrictions, the opening of a handful of new mines could mean tens of millions of tons a year of additional coal production.

Finally, the Draft ES tackles non-Federal, non-Indian coal, which includes 2,553 outstanding state leases plus fee coal. The Draft ES lists a projected 1985 production from these lands of 35.7 million tons, based on LPDO compilations. (Table 2-28) The LPDO non-Federal coal production forecasts are contained in a particularly opaque section of the LPDO report. Also, the figures cited in Table 2-24 do not appear anywhere in that report. It appears that information on all existing and planned mining was derived by LPDO from three sources: DOE mining plans, the DERC survey of utility company contracts and FEA's Western Coal Development Monitoring System. (LPDO pp. 60,61) Next a low range and a high range were developed. The low range was based on mining plans filed with Interior; the high range was based on a slight modification of a 1977 National Coal Association survey of new mines and major expansion plans. (LPDO, pp. 61, 62) These ranges--which are not listed in the LPDO report--were then used to develop projections about where new mines would be located. The figure of 35.7 million tons in 1985 from non-Federal mines does not appear to play any role at all in these calculations.

Doubts over this mysterious figure increase when it becomes obvious from checking through the multitude of charts, that this represents a significant decrease in non-Federal, non-Indian coal production. Total Western coal production in the six Western states for 1977 was 118,400 million tons (Table 2-8A). Federal production was 51,600 million tons (Table 2-8), Indian coal production in the six Western states was 11.5 million tons (DES 2-34), state coal leases produced 7.6 million tons (Table 2-26)--it is not clear how they are categorized.

Private coal accounted for either 55.3 or 47.9 million tons--depending on how state leases are categorized. Yet in 1985, in the midst of the great coal boom, private coal production in the six Western states is projected to fall by nearly 20 million tons a year.

After the Draft ES skims through the derivation of these estimates, they are agglomerated in Tables 2-29 and 2-30. Table 2-29 shows that total planned and likely production for 1985 is in excess of the 1985 medium scenario and within 16 million tons of the 1985 high scenario. In Table 2-30, the picture is markedly different for 1990. Total planned and likely production now falls 150 million tons short of the 1990 medium projection and 412 million tons short of the DOE high projection.

This shortfall seems significant. But further analysis of the supply figures casts serious doubt on the size and significance of the shortfall. Production potential does not incude approximately 160 million tons per year from underground FRLA's without legal or environmental problems (Table 2-23). When some increase of this potential is added, the shortfall under the medium scenario is significantly reduced.

Even underground FRLA's leave a major shortfall in meeting the 1990 high projection. Above, we have indicated some reasons why that projection is not credible. But assuming the existence of conditions which call forth the demand for such massive amounts of Western coal, it is ludicrous to imagine that private and Indian production (today a majority of production with 66.8 million tons) would stand still while total regional production was growing by a factor of seven.

AN OVERVIEW OF COAL SUPPLY AND DEMAND

The analysis in Chapter Two suffers from two fatal flaws: future demand is overstated, supply from existing and non-Federal leases is underestimated and undocumented. Thus, the analysis presents a picture of the future which is

highly skewed and suggests action based on that skewed vision of coming events. It portrays a future in which demand for Western skyrockets and must be met from new Federal leases.

The Final ES would benefit from a significant reworking of both demand and supply projections. At a minimum, DOE model runs should be undertaken with proper assumptions and the DOE analysis should take into account the inherent biases of the DOE model and make appropriate corrections. The supply projections merit a mine-by-mine discussion of existing Federal leases and FRLA's (this need not be published in full, summary statistics and explanations will suffice, but the background material should be available). In addition, better methods are needed to secure reliable information on Indian, state and private production.

III IMPACT ASSESSMENT OF PROGRAM ALTERNATIVES

Chapter Five of the DES purports to evaluate the environmental impacts of the preferred alternative and several other options. We believe this analysis is deficient for a number of reasons. To summarize:

(1) There is no rational basis described or explained for converting DOE production projections into regional production projections under the preferred program, the basis of the analysis of environmental residuals which makes up most of the assessment of the alternatives.

(2) The description of alternatives is incomplete and inadequate.

(3) The actual environmental assessments are sometimes faulty.

(4) Alternatives cannot be compared because of these faults and the lack of national cumulative analysis.

DOE-DOI "Disaggregation" has no rational basis

The principal component of chapter five's environmental assessment is the determination of environmental residuals which result from various coal production levels and patterns identified by the Department in Table S-2 and Appendix H. These production projections are somehow derived from Department of Energy projections. The process for converting from DOE to DOI projections is entirely conjectural. Appendix H could not explain the basis of the conversion, and Departmental personnel were hard pressed to explain it in public meetings. One of the reasons for the adjustments is well justified--the inaccuracy of the DOE projections as described in these comments, supra. However, the adjustments do not reflect what we believe are rational attempts to correct DOE's errors. For example, Powder River production projections are untouched by DOI's adjustments, except for the 1985 High Powder River estimate, which is actually 70 million tons higher than DOE's estimate!

Further comparing Tables S-2 (DOI projections) and 2-29 (DOE estimates), we find that Interior's estimates for 1985 production exceed DOE's forecasts in five regions and throughout the West by 145 million tons, (high level). In 1990, the DOI medium and high estimates each exceed DOE's in three regions and throughout the West by 94 million tons for the high level. When asked about these inconsistencies

at the Denver, Colorado DES hearing, Departmental personnel indicated that the Coal Management Office had arbitrarily adjusted some of the projections in order to observe what would happen to the environmental impacts. Based on this explanation, we believe that the projections do not actually indicate the regional productions which could be expected under the preferred alternative, or for that matter, any other program. Hence, the environmental loadings which result from application of the Coal Impact Estimation Program (CIEP) to these production projections do not represent the environmental impacts of the preferred program. Prior to analysis of the preferred alternative, the Department must more clearly explain the process for disaggregation and conversion beyond the description provided in H.2.2 to allow a more accurate picture of the actual regional production targets and thus the impacts resulting therefrom.

Alternatives

The analysis of alternatives is insufficient in a number of respects. The most crucial is that alternatives to the preferred alternative are not "whole," or "integral" programs but only pieces of the preferred alternative. It is more likely that some combination of alternatives must be applied because of various federal laws and court decisions. The most likely option which does not require immediate leasing is a combination of the no leasingalternative with a variant of the preferred alternative, in which the department attempts to upgrade land use planning and multiple-use resource data during an initial no-leasing or even emergency-leasing-only period.

The proposed alternatives principally address the question of "how much coal to lease?" Additional alternatives must evaluate alternative methods for environmental protection and land management. The DES makes a brief stab at this analysis, but falls short. (e.g., 5.4) It establishes such extreme subalternatives as to preclude meaningful evaluation. For example, it suggests controlling the method of mining on Federal leases to require the use of deep mining or alternatively proposes no mine plan controls at all. As a result, it languishes in a legal debate

instead of evaluating a legally acceptable alternative which would fall somewhere between these two extremes. For example, it could suggest the leasing of a certain mix of lease properties to result in greater deep mining than is likely to happen in an unconstrained market. The DES points out that by 1990, under the medium level scenario, only 8% of western reserves will be deep-mined (p. 5-127) despite the fact that deep reserves make up 56% of the resource coal of the Mississippi. (See Table 2-3). Evaluation of trends in some western production regions would probably reveal even more extreme discrepancies. The DES does not consider the leasing of tracts which would lead to future deep mining equivalent to 56% of production.

Similarly, the discussion of control of coal end-use gets bogged down in a legal argument, avoiding any substantive discussion of the pros or cons of end-use regulation. Even if the department's legal caution is proper, it should evaluate the option, since CEQ guidelines require the evaluation of alternatives even outside the jurisdiction of the decision-making agency. Moreover, the DES ignores that the Department may have jurisdiction to control end-use in many cases. This would occur, for example, where the lessee or a customer proposed mine-mouth generation or energy conversion using the leased coal, where such conversion facilities would require rights-of-way on federal surface. Conditions could then be placed not only on the lease, but also on the right-of-way permits.

There are several alternatives or program subalternatives which could be evaluated which are not. These might include some or all of the following: (1) Purchase or condemnation of existing leases. (2) Use of exchange authority in SMCRA for alluvial valley floors. (3) Use of land use management tools to protect areas of critical environmental concern in existing leases. In particular, FLPMA did not subject protection of such areas to valid existing rights; thus, such protections may be applied if they do not amount to the taking of property. (4) The revision of lease terms for environmental protection or other purposes for lease renewals prior to 1986. (5) Executing the invalidation of legally questionable PRLAs. This possibility is raised, but it is not included as an integral part of the

preferred alternative. In addition, the DES does not evaluate the possibility of applying existing or new FLPMA land use plans to existing leases in which existing lease conditions provide for maximum protective land manager discretion and may allow the application of new land management protections.

Another alternative is offered by section 206 of FLPMA. In order to efficiently develop State leases and leases held in checkerboard land, the Department could explore the exchange of lands, in a program coordinated with each state, so as to create logical mining units where present lease-holdings are not appropriate for economic development. Potential benefits of such a provision would be increased flexibility, distribution of unavoidable social impacts and costs, and a possible tool to obviate the need for haste. This option, upon evaluation, may not be an appropriate basis of a coal program or even feasible, but it and other alternatives should be addressed.

Questionable environmental analysis

In addition, the assumptions on which the environmental analysis is based are inadequate. Most serious, the Packer study of success in reclamation is extremely questionable. Packer's estimates are mysterious at best, for several reasons. First, no derivation for Packer's time-frame estimates is presented, either by Packer, or in the DES (5-17) This may be due to the fact that Packer's study was written in early 1974, and according to Packer, the earliest reclamation efforts were begun in 1964, and abandoned in 1971, due to lack of success (Packer, p. 22). The second oldest, and longest-running effort was begun in 1967, less than seven growing seasons before the writing of the study. Second, no work was done on the nutritional value of the plants that had been produced, and no grazing had been allowed on any significant areas. No mention is made of the fact that artificially fertilizing soils may result in their premature exhaustion of usefulness. There was simply no basis on which to determine either the value of the "rehabilitated" areas as rangeland which is capable of supporting animal use, or the long-term productivity of the rehabilitated areas.

Information on these vital aspects of rehabilitation is conspicuously absent from the draft ES. The Surface Mining Control and Reclamation Act requires that land be restored to "a condition capable of supporting the uses which it was capable of supporting prior to any mining..." (§515(b)(2).) Packer's objectives for rehabilitation were not that broad; they were

primarily the restoration of vegetative conditions, with no end-use considerations specified. Packer states that almost all surface mined land can be rehabilitated within 15 years. But the Study Committee of the National Academy of Sciences found that rehabilitation of the drier sites may take decades, or even centuries to occur naturally, with the evolution of a stable succession. And, as the NAS pointed out, "[r]ehabilitation of mined lands, however, requires more than achieving a stable growth of plants. If environmental degradation is to be avoided, the plants themselves should be a mixture of native species capable of sustaining the former native animals....Environmental protection also requires finding means to avoid the impact of surface mining on surface water and ground water. Pertinent data for rehabilitating mined land in ways that will promote wildlife, aesthetics, erosion control, and water quality are virtually nonexistent. The necessary research has barely begun." (Rehabilitation Potential of Western Coal Lands, National Academy of Sciences, 1974, pp.2-3). The study committee concluded that some sites could be rehabilitated "with a high probability of success," some with lower probabilities of success, and some "cannot be rehabilitated at all on the basis of what we know today." (p.53).

In relation to the use of fertilizer, it is important to realize that the value of soil amendments is widely variable. Some treatments, for example, will increase the yield of plant production, but decrease the nutritional value. Since an animal will only eat a limited quantity, the net result may

be negative. Further, the relation of one element to another, and of all elements to all others, is critically important. The potential for rehabilitation is dependent on local, site-specific factors. The draft EIS attempt to determine rehabilitation success on a regional basis, therefore, can have little meaning.

The time estimates for reclamation, based on Packer's unrevealed derivations, are presented quite optimistically. It is generally agreed that available moisture is the biggest limiting factor in reestablishment of durable plant cover in many areas, and especially in the Northern Great Plains and Southwestern areas. Should drought recur, as is virtually certain, the losses may be extensive. "Because precipitation is small, and potential evaporation is great, this area is always delicately balanced, even in wet years, on the brink of drought." (North Dakota Geological Survey: Geologic, Hydrologic, and Geochemical Concepts and Techniques in Overburden Characterization for Mined-land Reclamation, by Moran, Groenewold, and Cherry, 1978, p.1) The data used by Packer, and the Department of the Interior, are for precipitation. But precipitation does not equal available moisture for plant use. Trelease, et al.(1970, Water Resource Series #19, Consumptive Use of Irrigation Water in Wyoming, Water Resources Institute, U. of Wyoming) note that fewer than half of the years achieve mean precipitation. Does that indicate that fewer than half of the reclamation estimates are credible? About 30% of the annual precipitation is never absorbed at the

ground surface to become effective soil moisture, due to sublimation of snow, interception of growing season precipitation, and runoff from thunderstorms.

Considering that actual input to soil moisture is therefore 30% less than the figures used by Packer, and only that much in good years, the rehabilitation potential estimates are certainly skewed in favor of the coal industry. For instance, Packer states, on p. 13, that Campbell County, Wyoming, has strippable coal lands which receive 16 inches of precipitation in the amount of 89,395 acres, and 29,778 acres which receive 15 inches of precipitation. 166,375 acres, the remainder of the coal lands in the county, receive 14 or fewer inches. But from the plant's point of view, this means that 89,395 acres receive 11.2 inches, 29,798 acreas receive 10.5 inches, and the remainder receives 9.8 inches or less.

Because of the lack of experience at the time Packer's study was written, it is clear that he was forced to rely on theory. In fact, one of the purposes of the study was to test the theory against the available experience. It did fairly well, if one does not include as factors the extensive use of fertilizers and irrigation. Even now, there is a maximum of 11 growing seasons from which to extrapolate, and the majority of those areas which have been reclaimed (or not, depending on the definition applied) have been treated in some way, judging by Packer's study.

One of the issues overlooked by the DES

is the lack of understanding of the effects of the use of fertilizers and irrigation. As an example, it is well known that trace elements are mobile to varying degrees in soil, and one of the factors which is most important is the pH of the soil water, and the quantity of the soil water. Boron and cadmium vary in mobility as a function of pH. In the neutral and alkaline soils, these elements are relatively immobile, and do not comprise a hazard to grazing animals. But addition of fertilizers and moisture in excess of naturally occurring amounts will change the leaching characteristics and rates, hydrogen ion concentrations, and the development of the soil profile such that elemental mobility can be greatly increased and potentially toxic plants produced. But we do not know what the chemical characteristics of mine spoils are, as is pointed out elsewhere in these comments, and we do not know whether the acidification of soil may in a given case be desirable, to decrease the mobility of elements which are more dangerous at higher pH. Nor do we know the effects of the interactions between the fertilizer and the trace elements that may be present. (Curry, Biogeochemical limitations on western reclamation, 1975). Soil acidification can result in many ways that are not readily predictable, and can have significant effects upon future productivity. An example of this is interaction between nitrogen-fixing bacteria and nitrogen added as fertilizer. The resulting increase in hydrogen ions may force release of available nutrient cations, such as calcium, magnesium, and potassium, from storage sites. This could produce greatly stim-

ulated plant growth at the time of occurrence, and may result in depleted soil values subsequently. Then, another application of fertilizer is required, and the vicious cycle is underway. (Curry, Biogeochemical Limitation on Western Reclamation - The High Northern Great Plains Example, pp. 18-47 in Practises and Problems of Land Reclamation in Western North America, Mohan K. Wali, Ed., 1975).

Another important factor is that fertilizers and irrigation may change the botanical composition of the area of effect. This may result in fine-looking stands of vegetation for publicity, but they may not last if the treatments are ended. When the artificial support terminates, adjustments will be required, possibly in direct proportion to the amount of time elapsed under the artificial stimulation, or possibly shorter or longer. We don't know. It is probable that some sites will be delayed in restoration by current applications of artifical support, with resultant development of anomalous levels of production and depletion of soil nutrients which may be in very short supply.

The extent of knowledge and experience with reclamation techniques will not support the statements made. It is closer to the truth to observe that the question of whether any areas can comply with the requirements of SMCRA is still open.

Reclamation potential is not the only shortcoming in the DES's analysis. The use of Water Resources Council (WRC) projections for water use leads to major problems which negate the usefulness of the entire water consumption assessment. In particular, the WRC projections include a certain level of development of western energy resources which may or may not include that related to the development of federal leases. As result, there is the difficulty of "double counting" water consumption impacts, rendering WRC data useless. It would be possible to only evaluate water consumption residuals, comparing them among the various scenarios and program alternatives. However, without a baseline water consumption and supply analysis, there is no way to evaluate the effects of the alternatives on existing and projected water uses outside the energy sector. At the very least, though, the WRC analysis of "Calculated Flow with Normal Development," appearing on Tables 5-15 et seq., indicate that there are expected seasonal water deficits even without double counting the effects of energy development in some western regions at least during dry years. This would essentially mean diversion of water from existing or historic uses during such periods or the requirement of new water storage construction, a secondary impact not evaluated by the DES. Without, however, some method of disaggregating energy from non-energy data in the WRC model, there is no meaningful way of evaluating and comparing alternatives on the basis of water consumption.

Socioeconomic impacts are relegated to insignificance by the environmental residual methodology of the DES. By their very nature, these impacts are local but extreme. The DES prefers to ignore the isolation of extreme impacts to very local populations, preferring to sum population and employment impacts over vast tracts of land which have no relevance to the evaluation of social impacts. For example, the Powder River region includes thirteen counties, but residents indicate that most development has concentrated and can be expected to concentrate in the future on Campbell county. The Denver-Raton Mesa region includes the Denver metropolitan area, yet most of the industry interest is in the Raton Mesa area in relatively underpopulated southern Colorado, certainly outside of the major portion of the

1.9 million population attributed to the coal producing region. In each case, comparing coal related population increases to a 1975 baseline which includes the entire region makes absolutely no analytic sense. Any population impacts should be compared to baseline population in the locally affected communities, individually. A programmatic statement may not be able to evaluate each and every community, but could certainly indicate likely impacts in the more important communities in the affected regions.

Similarly, impacts on state and local expenditures have been diluted by considering only the impact in comparison with total budgets of all state and local governmental units. A 1990 impact on government expenditures in Colorado seems miniscule, but in real terms the $16 to 33 million will be mostly spent by local communities with budgets which are presently almost invisible.

In a related factor, only land disturbance caused by the presence of mining operations, beneficiation, conversion, use and transportation of coal has been considered. This is unacceptable. Surface mining of coal necessarily requires human involvement, as reflected in projected population increases. However, areas which will be temporarily or permanently disturbed for residential, commercial, industrial and governmental structures, ancillary support structures, recreation, and corridors for the service and utilities of such populations have been ignored. Stating that the "multiplicity of site-specific factors which would dictate acreages committed to such developments" renders quantification "beyond the scope of this document" is not a statement of environmental impact. It may be noted that residential development has traditionally taken place on the best agricultural lands, because that is where towns have been historically located. Expansion of existing urban areas to serve energy booms will only expand the agricultural losses.

On Trace Elements

Although the draft ES for the preferred program mentions their existence four times and supplies a table of air pollution emission factors for 22 of them, trace elements are basically ignored. Their effect on the environment, however, may be as large as any other effect, and may well be more devastating in the long run. Trace elements are single chemical elements. These elements are very seldom found in a pure isolated state; they are usually monatomic and ionic, and are found in compounds. Some compounds, such as organic mercury compounds, are far more toxic than others, such as inorganic mercury compounds. But there is great variation in this. The extent of our knowledge of trace element chemistry and biochemistry is miniscule, despite episodes such as the mercury poisoning in Minimata, Japan. A complicating factor there was the unknown biological transformation from inorganic to organic forms of mercury. But it must be emphasized that most of the damage done so far by trace elements is never identified; sub-clinical brain damage, for example, is almost impossible to diagnose (and it is also irreversible).

The unkown, and currently unknowably large mobilization and release of trace elements which will be a necessary result of the proposed coal scheme will have effects at both ends of the process. First, unknown quantities of trace elements with unknown effects will be exposed to the biosphere by mining. Second, unknown quantities of trace elements with unknown effects will be exposed to the biosphere

by combustion of coal and the resulting air emissions and by dispersions from other wastes, such as various types of ash and scrubber sludge, and so forth.

The critical points are that: (A) we do not know how much of a threat is posed in the short term or the long term; (B) trace elements, by definition, do not degrade or go away - they may be attached to other elements or compounds with varying effects, but the only mitigation of the threat is immobilization in such a way as to take them out of circulation; and (C) as a hint of things to come, it follows from the table on p. 5-54 that the burning of one million tons of coal will result in the air pollution emission of 1,377.8 tons of the 22 trace elements in the table.

A table of selected elements and their toxicities is reported by Gough and Shacklette, U.S.G.S., 1976. Much of the data is in parts per million, abbreviated ppm. To grasp the idea of a part per million, visualize a football field, 30 by 100 yards. Then build a metaphorical swimming pool that size and fill it to a depth of five feet. To add one part per million to the pool, add very slightly more than one gallon.

The possible effects of trace element poisoning are inestimable at this time. Contamination of soil by air, surface water and groundwater pollution may have beneficial effects, or no effect, or may permanently damage the soil for use by plants or by animals consuming the plants. Contamination of plants, regardless of soils, may be toxic to animals. Contamination of ground and surface waters, by direct exposure due to mining or atmospheric pollution may be toxic to irrigated lands, either immediately or in the long

run, and to anima feeding on contaminated vegetation, as well as to humans thro water supplies. It has been proposed quite seriously that the Roman Empire's decline and high rates of sub-normality, especially among the upper classes, may have been due to widespread use of lead in pipes, the lining of aqueducts, and cooking and drinking vessels. We simply do not know what the effects may be.

It is also known that almost all of the trace elements are affected, in terms of availability, by such factors as soil and water pH. Further, the synergistic toxicity of these elements is a factor that is known to exist, but known to the extent of prediction of possible consequences of proposed activity. The research needed to determine the effects of this particular proposed activity is sorely lacking. The draft ES apparently takes the position that two populations should be the most severely affected guinea pigs. These groups are the stockmen and farmers of the West, and the urban air-breathers of cities with coal-fired power plants. Of course, there is no group that will not be affected, as measurements of lead levels in Arctic and Antarctic snow fall demonstrate, but it appears that these two groups will be the first and hardest hit. No effort is made to inform the public of this, by the DES

A LOOK AT AVAILABLE INFORMATION

What we don't know is truly impressive. The U.S.G.S. has undertaken the Geochemical Survey of Western Energy Regions to try to determine the geochemistry of the area: overburden, surface

materials, ground and surface waters, and plants. The first major goal is to determine the extent of sampling required to perform the task, and that has been a major goal in itself.

The importance of this information is tremendous. As illustrated by the table on p.5-54, we have an idea of the air emissions from coal fired power plants. The U.S.G.S. appears to be the lead agency in the determination of impacts in areas near coal mines. Information on the chemical character of coal overburden is especially important for two reasons. First, the available information for one mine, the Black Thunder mine, which may be the only available information of its kind, shows that the coal itself is relatively low in trace elements compared to the strata directly above and below the coal seam. (This mine is in the Gillette, Wyoming area.) Therefore it is critical to know if this is the case at other mines, and if so, whether these strata should be isolated from groundwaters, as well as surface leaching and revegetation attempts. Second, mining of the coal will alter forever the existing aquifer structure. Aquifers may reestablish themselves, but they will not be separated by the coal seam. Aside from the loss of seeps and springs flowing from the upper aquifers, we must find out what will be present in the surviving aquifer. We do not know what the long-range effects of the aquifer's use will be. We do not even know what would be significant. Further, the chemistry of groundwater and surface sediment is extremely complex and appears to be largely unknown for trace elements.

The variability of naturally occurring trace elements

is quite wide. This is due in large measure to the variability of their occurrence in the parent rocks which are transformed into soils, as well as other factors. In soils of the Powder River Basin, there is fairly small variation between surface soils (0-2.5 cm. depth) and subsurface soil (15-20 cm. depth) (Anderson, Keith and Connor, 1975). But there may be significant differences between the A and C horizons of the soil (Tidball and Severson, 1976). The number of samples required to map the variation in soil levels of trace elements at the A and C horizons ranges from 5 to indefinitely large, for relatively small areas. This means that there will have to be extensive sampling in any mine site to determine the levels of trace elements in the upper soil horizons alone.

In terms of availability to plants, it is reported that little success is achieved in the use of standard agronomic extraction techniques for the measurement of soil characteristics. (Severson, McNeal and Gough, 1978.) Therefore, either a technological breakthrough is required, or standard, low-cost analyses will have to be supplemented by full-scale chemical analyses.

The chemistry of water associated with coal areas is highly variable, as is the amount of trace elements in sediments of surface streams. (Keith, Anderson, McNeal and Boerngen, 1976; Van Voast, Hedges, and McDermott, 1978, U.S.G.S Water Resource Investigation 77-80, 1977.) There has not been sufficient time to determine the long-range effects of destruction of aquifers and their reestablishment in radically altered chemical environments, such as may be found in mine spoils.

Mine spoils will be used to reclaim land, and therefore questions have been raised concerning the suitability of this material for revegetation and restoration to the full use of the land which occurred prior to mining, as required by SMCRA. To determine the trace element concentrations and variability in mine spoils from a particular mine, it may be necessary to take more than 30 samples within a 25 square meter area (Severson, 1978), or as few as five samples for some elements. Only then would one have an idea of what was actually present in that specific area.

Note that simply covering the mine spoils with topsoil may very well be inadequate. There is no solid information on the long-range success of this technique, in terms of SMCRA-level rehabilitation, although topsoil dressing of spoil piles may produce vegetative cover and minimize erosion. Water movement within mine spoil piles is not well understood, but it is known that water moves upward, as well as downward, and laterally in mine spoils (Montana Agricultural Experiment Station, Report No. 114, 1973). Mine spoils vary significantly from mine to mine; indeed, there is even variation between different areas of the same mine (Erdman and Ebens, 1975).

The molybdenum content of sweet clover growing on mine spoils was measured. "Coal mine spoils are geochemically anomolous when compared to naturally occurring surficial materials (Sandoval and others, 1973). Despite the increasing practise of top-soiling contoured spoil banks, we find evidence that these anomolies are being reflected in the element composition of vege-

tation growing on the modified substrata." It is concluded that the molybdenum concentration in sweet clover growing on mine spoils is "probably sufficiently high to induce metabolic imbalances in cattle and possibly sheep in subclinical, if not acute, levels assuming the animals were to feed predominantly on this legume." (Erdmand and Ebens, 1976.) A later report stated:

> It is difficult to arrive at a consensus from the literature for critical levels of Mo and Mo:Cu ratios, but five ppm for Mo and a ratio of 2:1 are reasonable as being critical for cattle. It thus seems that at least five [of the eight] mines [surveyed] could present some management problems with regard to cattle operations. (Erdman, 1978.)

Sweet clover is a very popular plant for rehabilitation use because of its high nutritional value, and high rate of success, among other factors. The most popular plant for reseeding, in 1960 and probably to date, is crested wheatgrass. It dominates the revegetated spoil banks at many mines and was sampled from reclaimed spoils, as well as comparatively normal soils, at the Dave Johnston Mine in Converse County, Wyoming. Concentrations of cadmium, cobalt, fluorine, uranium, and zinc ranged from 140% to 400% higher in the spoil-grown wheatgrass than in the control area. Conversely, phosphorus in the spoil-grown grass was only about two-thirds that of the control. "It is clear from these results that a substrate of reclaimed spoil material can affect the trace element chemistry of crested wheatgrass." (Erdman and Ebens, 1976.)

A final hint of things to come is supplied by

the U.S.G.S. studies of power plant trace element pollution of surrounding soils and plants. Big sagebrush, lichens, and Indian ricegrass growing downwind from coal-fired power plants have all shown increased levels of various trace elements, although the extent of information on this is quite limited. (Connor, Anderson, Keith and Boerngen, 1976; Anderson and Keith, 1976; Gough and Erdman, 1976; Connor, Keith and Anderson, 1976.) Several baseline studies near preoperational power plants will allow collection of more data in the future, but the techniques for determining the effects of power plant emissions are still being developed. In fact, knowledge of trace element behavior in power plants is still embryonic.

Overall, what we can say is this: There are still considerable uncertainties regarding the total impacts and specific quantification of trace elements. However, much is already known regarding the trace element contamination of some western coals. Also, there is sufficient information available to arouse considerable caution regarding the biological impacts of the dispersal of such toxic materials. The DES does not address this topic with sufficient detail. It does not even indicate the uncertainties which may mandate the need for specific baseline data accumulation for toxic elements and land use planning responsive to such data.

This discussion raises the question of need for more extensive baseline data studies on other environmental impacts and conditions. Such data, largely deficient today, would include water and groudwater chemistry, hydrology, meteorology, geochemistry, soils, and like factors necessary for adequate land use planning.

TRACE ELEMENT EMISSIONS FROM COMBUSTION OF ONE MILLION TONS OF COAL, DERIVED FROM FIGURES GIVEN ON PAGE S-54 OF FCMP DEIS.

1) EMISSION FACTORS GIVEN ARE IN g/10^6 Btu. Coal is specified to be 11,200 Btu/lb. Conveniently, two thousand times 11,200 Btu/lb = 22400,000 Btu/ton = 22.4 x 10^6 Btu/ton. Therefore, 22.4 times number of grams per 10^6 Btu = grams per ton. GIVEN EMISSION FACTOR IS PRESENTED IN COLUMN I. GRAMS PER TON IS PRESENTED IN COLUMN II.

2) MULTIPLY GRAMS PER TON BY ONE MILLION TO COMPUTE GRAMS PER MILLION TONS. DIVIDE GRAMS PER MILLION TONS BY 453.6 (NUMBER OF GRAMS PER POUND) TO COMPUTE POUNDS OF EMISSION PER MILLION TONS OF COAL BURNED. THESE COMPUTATIONS MAY BE DONE IN ONE STEP: N(grams per ton) times one million and then divided by 453.6 = n · 1,000,000 ÷ 453.6 = n · 2,204.5855. 2,204.5855 IS THE CONVERSION FACTOR BY WHICH Col. II IS MULTIPLIED TO GET Col. III, POUNDS OF EMISSIONS PER MILLION TONS OF COAL BURNED.

ELEMENT	EMISSION FACTOR (COLUMN I)	GRAMS PER TON (COLUMN II)	POUNDS PER MILLION TONS (COLUMN III)
ANTIMONY	0.20	4.48	9,876.5
ARSENIC	1.3	29.12	64,197.5
BARIUM	20.2	452.48	997,530.8
BERYLLIUM	0.099	2.2176	4,888.9
BORON	2.47	55.328	121,975.3
CADMIUM	0.001	0.0224	49.4
CHLORINE	6.48	145.152	320,000.0
CHROMIUM	0.624	13.9776	30,814.8
COBALT	0.194	4.3456	9,600.1
COPPER	0.547	12.2528	27,012.3
FLUORINE	3.32	74.368	163,950.6
LEAD	0.38	8.512	18,765.4
MANGANESE	2.02	45.248	99,753.1
MERCURY	0.00061	0.01364	30.1.2
NICKEL	0.599	13.4176	29,580.2
SELENIUM	0.089	1.9936	4,395.1
TELLURIUM	0.04	0.896	1,975.3
THALLIUM	0.01	0.224	493.8
TIN	0.036	0.8064	1,777.8
TITANIUM	15.6	349.44	770,370.4
VANADIUM	1.07	23.968	52,839.5
ZINC	0.499	10.976	24,197.5
ELEMENTS OMITTED INCLUDE ALUMINUM, BROMINE, BISMUTH, CALCIUM, CERIUM, CESIUM, GALLIUM, GERMANIUM, IODINE, IRON, LANTHANUM, LITHIUM, MAGNESIUM, MOLYBDENUM, PHOSPHORUS, POTASSIUM, RUBIDIUM, SILICON, SODIUM, STRONTIUM, TUNGSTEN, URANIUM, AND NUMEROUS OTHERS.			2,754,345.5 POUNDS (1,379.8 TONS) OF "TRACE ELEMENTS" EMITTED IN THE BURNING OF ONE MILLION TONS OF COAL.

Agricultural Losses.

Losses of agricultural potential and productivity are not addressed effectively in the draft ES. The amount of arable and productive land in the United States is decreasing rapidly. Colorado alone lost 1.6 million acres in the last ten years, and is now losing approximately 300,000 acres per year. (Rocky Mountain News, Jan. 16, 1979, p. 3). Losses in more inherently fertile states, such as California and New Jersey, have been astronomical. The majority of towns, villages, and cities in the United States were settled where they are because of the agricultural productivity of the area in which they are located. Obviously, the huge expansion of urbanized area has created monstrous losses of agricultural land of the best quality. This crucial development may have been overlooked, in the light of our successes with irrigation and petro-chemical fertilization of monocrop agriculture. But the availability of petro-chemical fertilizers is rapidly decreasing, not only because of the depletion of petroleum supplies, and the increasing dependence on the super-intensive energy use which has characterized our economy, but because of the increased cost to the farmers of these imported luxuries. There appears no reason to suspect that this trend of dwindling supply and use will reverse in the future. At present, we have an agricultural surplus, but for how long? Would we have that surplus without cheap electricity for water transport, and cheap petrochemical fertilizer?

It should be noted that our agricultural surplus is very important in stemming the rising deficits in our international balance of trade.

But most important is the apparently overlooked fact that agriculture is life. There is no hesitation in the choice between eating in the dark and lighting, the problems of being without sufficiently affordable food. The loss of agricultural productivity may be due to temporary and reversible factors, or it may be due to irreversible permanent damage to land. The following is a brief discussion of some effects of the proposed coal scheme; it is by no means exhaustive, and does not reflect the depth of study that might be available from institutions, such as the Department of Agriculture, which was apparently not consulted in the preparation of the DES.

1. Permanent losses. The effects of soil contamination with toxic trace elements, and other substances, such as high levels of salinity, are often irreversible. If the land can be restored, it may be at such a high cost that the majority of potentially recoverable acreage will not be recovered because of economic inefficiency. The figures given on "agricultural opportunity costs" substantiate this.

Chemical-change related losses will also include losses due to irrigation with degraded water. The cost of water and its availability are going to be radically increased, and the water left for agricultural use may be drastically less useful than current supplies. This would, in turn, promote the use of

fertilizers and other chemical amendments, which would, in turn, further degrade the water quality.

Finally, the effects of air pollution are not known. The trace element contaminents from the combustion of one million tons of coal amount, for the 22 elements for which figures are given for emission factors, on p. 5-56, to 2,756,365.5 pounds. Trace elements are discussed elsewhere in these comments; suffice it to say here that their effects on agricultural productivity are not known, nor is their pattern of deposition from air pollution sources, or water sources.

The effects of even sulfur oxide pollution on agricultural productivity, and agricultural product quality, are not known. (Final Environmental Statement, Powder River Coal Region, U.S. Government, 1975, Vol. II .).It should be noted that prevention of significant deterioration air quality regulations will force most of the new power plant production farther away from demand centers than traditional location. What this means, in fertile areas as well as marginal areas, is not clear. But between prevention of significant deterioration for heavily polluted areas, and preservation of pristine areas, the middle ground is all that is left. There will be new sources polluting a great amount of farmland, with unknown effects.

2. Permanent losses. The creation of new roads, railroads, and aqueducts, and other fenced corridors will result in significant losses. Severance of agricultural lands may

render the use of those lands left economically inefficient, with the consequence of conversion to other uses, or abandonment. Fences cause serious problems for livestock, as well as wildlife which is compatible with livestock. The losses from fences alone are significant already. Transportation corridors also creat serious problems of access to other lands, such as BLM grazing lands, and access to water. (Final Environmental Statement, Powder River Coal Basin, 1975, Vol. II, pp. 1-563 - 565.)

3. Possibly permanent losses. The pattern of land tenure in coal areas has already been drastically changed. Ownership of grazing land, and concommitant ownership of BLM grazing rights, is changing from family ownership to corporate ownership. The purchasers have little or no interest in agriculture; they are interested in the land as an investment in future coal mining. Although they may not have removed the land from agricultural use yet, their tenacity in maintaining that use is more dubious than that of persons involved in ranching. The FES on Powder River Coal Region development in 1975 reported that 60 + 100,000 acres had undergone this change in the four or five years prior to the writing of that statement (p. 1-153, Vol II). As discussed below, economically marginal operations will be the first to sell necessary water, which may seal the fate of a great amount of the land held by speculators.

4. Temporary Losses? The vast demands for water which are projected will create increasing demand for a smoothly functioning water market. Water rights are property rights, and

within the limitations of the substance itself - i.e., the nature of return flow, and evaporation, water rights are property rights. Current agricultural economics are hardly favorable, and the price paid for water will inevitably rise. Thus, the agricultural productivity which depends on saleable water will decline. Coal mining companies will have to acquire water, and so will municipalities. Whether removal of water from land which depends on that water for its current agricultural productivity will depend on whether the loss results in irreversible damage to the land itself. This may be expected in areas where a previous phenomenon in the 1930's caused erosional losses. Some of that land has been returned to productivity, but much has been returned only with addition of fertilizers and extensive investments in irrigation and other treatment. Therefore, a third category of losses should properly be considered - losses which can be undone on a temporary basis only. On the other hand, much of the land which is removed from grazing may benefit from a period of relief from grazing, so the picture is not all black.

5. Temporary losses. As a consequence of the high wages paid to miners and construction workers, a potentially serious proportion of the agricultural labor force will be drawn away from its present vocation. Because of mechanization, much of the lost labor could be replaced by modern implements. But the marginal operations will not be able to support the capital costs of such equipment, and land will go out of production. The opposite side of this coin is that operations which cannot afford equipment cannot afford to pay laborers or more skilled

personnel the wages that are being paid in the energy-development industries. Assuming that conditions may eventually stabilize within the same societal structure as presently exists, these losses might be temporary.

In summation, agriculture is necessary, and the depradations which it is suffering currently will be exacerbated by the proposed coal scheme. Losses will be permanent in some areas, and temporary in some areas. Long-term losses will also be created in less noticeable ways, such as yield decreases in response to air quality degradation in areas which are now relatively clean. The draft EIS fails to address these impacts.

On uranium

Recent evidence suggests that western coals contain considerable trace amounts of uranium. The dispersal of uranium in respirable particulates is a serious problem, especially due to its alpha emissions which will affect the lungs. This is a serious impact of any program which shifts coal production west. It should be addressed but is ignored by the DES.

On "Mineral Preemption".

On page 5-25, the term "preemption" of minerals is used where the meaning is "waste and dispersion" of minerals. In reference to the example of uranium in coal, the U.S.G.S. Bulletins on uranium in Wasatch coals tabulate the amounts in thousands of tons of U_3O_8 (See, e.g. U.S.G.S. Bulletin 1099-B). In terms of trace elements, which are primarily metals, the has an interesting sidelight. We acquired, in 1974, 100% of U.S. strontium requirements from Mexico, Britain, and Spain. 100% of our columbium came from Brazil, Malaysia, and Zaire. 98% of our cobalt from Zaire, Belgium, Finland, Norway, and Canada. 98% of our manganese from Brazil, Gabon, South Africa, and Zaire, making imports from those countries particularly attractive. Other figures of interest are: Chromium, 91% imported; Aluminum, 88% imported; Fluorine, 86% imported; Mercury, 82% imported; Nickel, 73% imported; Selenium, 63% imported; and so forth. (Keller, Environmental Geology, 1976, p. 313).

Our massive dependence on imported rare earths and metals does not militate in favor of a national plan to disperse millions of tons of them into the atmosphere, with unknown effects.

Alternatives inadequately compared

If a major requirement of a programmatic statement is to compare alternative programs, as we believe it is, then this DES has failed. We can identify essentially two levels of analysis. The first is to identify the principal mechanisms for determining the level of demand and establish both the level of leasing activity and its distribution. The DES attempts to identify a limited set of production distribution schemes and the impacts of each such scheme, but fails because the environmental analysis is faulty, as described in greater detail above. It also fails because the impact estimation methodology obviously ignores most secondary and higher level impacts. It does not attempt to evaluate cumulative national impacts or even make regional tradeoff judgments which could form the basis of determining which program alternative or combination thereof is in the public interest.

The second level of analysis should identify the alternative program elements which specifically relate to land or resource management and the mitigation of environmental impacts, regardless of the level or distribution of coal production. It is this level of analysis to which most details of the preferred and other alternatives should be subject. However, this is entirely omitted from the DES, with the exception of a few subalternatives which receive short shrift because of extreme assumptions. The DES simply does not evaluate the comparative environmental impacts of alternatives to lands unsuitable criteria proposed by the DES or other major components of the land management components of the program. This level of analysis also fails because the description of alternatives is inadequate, particularly alternatives which relate to land management issues.

IV SHORTCOMINGS IN THE PREFERRED ALTERNATIVE

There are several components included in the Preferred Alternative (PA). These include, very briefly, the following:

(1) Land use planning
- identification of coal lands
- unsuitability findings using lands unsuitable criteria (LUC)
- identification of resource tradeoffs

(2) Activity planning

- establish regional production targets
- identify proposed lease tracts
- rank tracts
- preparation of regional EISs as part of activity planning

(3) General procedures

- EIS strategy
- public involvement

(4) Start-up considerations

With a few exceptions, we will comment on these procedures and process components.

Land use planning

The Federal land use planning process will be--indeed, FLPMA requires that it must be--the basis for all resource management, including coal leasing decisions. That process will help identify coal lands, lands unsuitable, resource tradeoffs, as well as provide the information necessary for the ranking of tracts and preparation of the regional sale EISs. The process and the data and resource inventory which is part of the land use planning process cannot be taken lightly. It is the very foundation on which any coal management program must be built or will fall. Unfortunately, there is little public confidence in that land use planning process as it exists today. The application of sophisticated veneers on a crumbling foundation provides no protection to the lands or to the public interest. There are three primary failings of the existing land use planning.

First, the data and resource inventories which support the existing management framework plans (MFP) is outdated and unreliable. It was collected as part of EMARS or before. It clearly does not take into account the new data

requirements under the provisions of FLPMA or SMCRA, particularly resource inventory or other baseline data which would identify areas unsuitable for mining or not reclaimable under SMCRA or areas of critical environmental concern protected by FLPMA. Indeed, the Acts both came after the collection of existing data. The DES does not indicate the level of data deficiencies which have been anticipated or discovered in the "test" applications of LUCs, but we anticipate, given our experience with MFPs that such deficiencies are considerable. The Final ES should report the level of data deficiencies and indicate the steps necessary to cure them prior to implementation of the PA. In addition, we are told by colleagues in the Northern Great Plains and in Western Colorado that surface renewable resource data is often entirely missing from resource inventories if the surface in a split estate is not federal. The district offices in question responses to citizen complaints indicated that they only were required to inventory and plan for federal multiple uses, thus conveniently converting coal into a monoculture.

Second, citizen involvement in the development or revision of MFPs has been superficial at best. Often MFPs are unavailable or inaccessible--many times existing only in the form of massive files. In addition, public meetings are or give a strong flavor of meaninglessness. For example, a 1977 meeting on four Colorado planning units was held after only four days notice. No copies of the MFP were available and unanimous requests from public participants for comment extensions were denied because the Colorado BLM office wished to make decisions on lease tracts within ten days. At one 1978 meeting on the South Park Colorado MFP, off-road vehicle enthusiasts who participated in the meeting helped inadequate BLM personnel collate and compile comments and concerns recorded by all participants, conveniently forgetting (inadvertently omitting?) many conservationist concerns in the transcription process. Meeting participants have never found any evidence that even this information, which included several important and valuable comments, was ever used by the BLM. We often get invitations to attend meetings on MFPs which include no hint of BLM agenda or otherwise suggest the purpose of the meeting.

Often we are aware of good faith, genuine efforts to use sophisticated visual or audio-visual aids or innovative group interaction techniques. However, they often fail because of a basic misunderstanding of the nature of public involvement in the administrative process.

Worst of all, the plans, including any components resulting from public involvement, are discretionary. For example, a northwest Colorado MFP recommended management of the Little Yampa Canyon as a candidate for Wild and Scenic River status, but the BLM allowed construction of a railroad in the canyon anyway. In west central Colorado, a 2200 acre short term lease resulted despite an MFP recommended limit of 480 acres for such leases. Friends of the Earth, together with the Western Colorado Resource Council and several other organizations have appealed the revision of the North Fork (Colorado) MFP, which administrative appeal details many problems we perceive in the existing land use process, and which appeal we hereby incorporate by reference.

New Resource Planning Regulations Do Not Solve Problems

Unfortunately, the proposed planning rules do not solve many problems. Section 1601.5-2 states that district managers "Shall prepare criteria to guide development of the resource management plan . . ." (RMP). In other words, for each of 178 RMPs, the district managers create new instructions. These are supposed to be based on all applicable laws, executive orders, and regulations. Not only does this put an unfair burden on district staffs, but our experience gives us little confidence in the detailed legal knowledge of local BLM offices. Even worse, the planning criteria shall be based on "Available inventory and planning budgets and time available before resource management decisions must be made." We believe these rules together will eliminate any legally binding weight carried by the requirements of FLPMA and will obviate all consistency.

The plans will not be plans. Amendments will be allowed which respond to conflicting use applications and nullify the effect of resource planning. (proposed rules 1601.6-3(b)).

Appeals of resource management plans (1601.6-1(c)) are available only to those individuals who are "directly affected," thus favoring resource developers over members of the public, and such appeals are only protests which do not reach the Secretarial level for review.

Records are supposed to be maintained which only "support" conclusions of the RMPS. (1601.7-1). Evidently conflicting data may be discarded. There is no requirement that RMPs will be distributed free to interested members of the public. (1601.3(i)&(1)).

FLPMA and its legislative history make perfectly clear the high priority Congress placed on "prompt" or "immediate" attention to areas of critical environmental concern. Yet, had we not read the Act, but only the preferred alternative and recent departmental documents, we would have guessed that FLPMA required the prompt and immediate identification of coal lease tracts. Indeed, despite a professed departmental need for ACEC procedures, the proposed planning rules extremely shortchange this congressional priority. The procedures outlined in draft guidelines are skeletal at best. For example, there are no procedures established for public petitions. Incredibly, the draft places the additional criteria of "protectability" on ACEC identification, a factor somehow tortured out of the Act and its history. It implies that areas not possible or economically feasible to protect shall not be classified. This precisely reverses the act, which clearly states that where management attention is required, an area must be protected. The guidelines are still in draft form and have not been proposed as regulations. Moreover, they come as an afterthought in the FLPMA regulations and after coal management program decisions. Interior simply has not responded to the urgency Congress expressed in the Act and dozens of places in its legislative history.

We believe that at the very least, the FLPMA planning regulations must include precise criteria and procedures for the identification and protection of areas of critical environmental concern. They must also specify in considerable details the non-discretionary procedures which district personnel must follow in preparing RMPs and making land use decisions in such RMPs. The RMPs must be substantially binding on resource decisions and coal resource planning which follows its adoption and should not be subject to flippant amendment. In addition, specific other weaknesses identified above must be corrected. We will make more complete recommendations at a later date.

Lands Unsuitable Criteria

The centerpiece of the Department's preferred alternative is the lands unsuitable criteria. However, vagueness, exceptions, and lack of correspondence with SMCRA handicap this tool. Several exceptions nullify criteria, for example, and the burden of proof for identification of lands which are not reclaimable is precisely opposite of that intended by SMCRA. Specific substantive comments on the criteria will be included below with comments on the example regulations.

We must comment, though, on what we believe to be an illegal and unfortunate premature application of the lands unsuitable criteria. As part of the startup considerations (p.3-28), ten target planning units have been identified in which the proposed LUC will be applied. The Department has attempted to disguise this effort by calling this exercise a "field test" of the proposed criteria and claiming that if changes result, the supplements to target MFPs resulting from the first "field test" of the LUCs will again be changed to reflect changes in the LUCs. This, unfortunately does not correspond with instructions to State Directors from BLM to prepare supplements to target MFPs based on application of LUC "to be ready for a possible coal lease sale in mid-1980." Nor does it explain the urgency of the BLM or several other documents which express an unrelenting march to a 1980 lease sale.

The premature application of LUC is in violation of section 102(i) of SMCRA which requires "public participation in the development . . . of programs established by the Secretary" under the Act. The proposed LUC had not received public scrutiny prior to instructions (43 FR 57662) to State Directors to supplement MFPs. The BLM cuurently has no regulations in effect which relate to the designation of lands unsuitable and the promulgation and application of the LUC violate FLPMA's requirement of public involvement prior to agency actions (e.g., Secs. 102(a)(5); 103(d); 202(a),(f); 309(e); and 310).

The DES clearly states that "the key activity added to the land use planning process in the preferred program is the application of lands unsuitability criteria." Thus, the application of LUC to the target MFPs constitutes the implementation of the program and is a violation of the NRDC v. Hughes order. Moreover, we believe that application of the LUC prior to the finalization of this ES is a violation of NEPA. The LUC have been proposed under the authority of SMCRA section 522(c), FLPMA, and various environmental protection laws, regulations, and departmental policies (see DES, Table 5-72). The Department claims that the LUC are exempt from NEPA because of SMCRA section 702 (d). However, we have yet to see any reasoned opinion which explains how section 702's exemption of SMCRA section 523 also exempts section 522, FLPMA, the preferred program, or any other authority for the promulgation of the lands unsuitability criteria. We believe it is essential to fully investigate and evaluate the proposed criteria, including a complete analysis of alternatives in the DES--which is sadly lacking--but that it is inappropriate for the department to proceed with the implementation of the preferred alternative in the manner it has already done.

Resource tradeoffs

The third screen established in the PA is the identification of resource

tradeoffs which militate against coal development. [illegible]s will be addressed in our comments on example regulations. Suffice it to [illegible], here that the concept as outlined in the DES somehow seems to override what should be the statutorily required function of comprehensive land use plans under FLPMA. Moreover, the provision as proposed gives short shrift to non-coal resources.

Setting regional production targets

The lack of specific detail with respect to setting production targets in this DES, the proposed process for future program cycles, more basic problems in the DOE projections which drive DOI's production goals are discussed in other sections of these comments. Also, there are comments on the example regulations.

Tract ranking and Regional EISs

These will also be addressed in comments on the example regulations. The most serious problem is a lack of definite criteria by which tracts will be ranked.

EIS strategy

In response to a question by Peabody at the 3 January 1979 public meeting in Denver on the DES, Assistant Secretary Guy Martin and other department officials indicated their "hope" that EISs would not be necessary at the mine plan stage. It was explained that the department intends to prepare a "good enough" regional sale EIS to anticipate the site-specific impacts on each lease. We do not believe that is possible. As several industry representatives pointed out at the same meeting, it is impossible to propose a mining plan, reclamation, or even ancillary facilities until it is possible to obtain more definitive coal resource information necessary to do engineering and reclamation planning but which is unavailable prior to actual leasing. There is considerable NEPA case law which indicates that significant technical changes in proposed actions between regional or programmatic EISs and site-specific are legally sufficient to trigger site-specific EISs. Such impacts as hydrological impacts, air quality, water quality, subsidence or success of reclamation, and other equally fundamental impacts all depend on site-

specific mine and reclamation plans. The different natures of the federal actions and alternatives involved at each level also strongly indicate the need for separate EISs. For example, at the regional sale EIS stage, the department is evaluating how many and which tracts to lease on a regional basis; the alternatives analyzed at this point include different tract rankings and lease conditions. At the mine plan stage, however, the decision is the approval (for federal lands only) of mining and reclamation plans; the alternatives evaluated at that point include approval or disapproval, approval with conditions, and various technological environmental mitigation measures which are clearly beyond the scope of any regional sale EIS.

Finally, we would point out that the principal problem which a lessee may encounter is not the simple requirement of an additional environmental statement, but rather significant levels of uncertainty. We believe that the only way to eliminate that uncertainty is to require *a priori* a statement for all mine plan approvals on Federal lands.

Otherwise, the proposed EIS strategy is acceptable with some minor but essential clarifications and sharpening. Specifically, the programmatic (national) EIS should assess interregional tradeoffs based on environmental criteria. Instructions for preparation of regional EISs should include the requirement that regional, cumulative impacts of proposed and existing activities, including outstanding mine plan approvals be analyzed. In addition, EISs should not be required only for RMP adoption under the FLPMA planning regulations, but also for RMP revisions and adoption or revision of land use analyses under §§ 1601.0-5(g) and 1601.6-4, as proposed . Finally, as we indicate in several places throughout these comments, baseline data and resource inventories must be adequate for all environmental analysis and planning, including ES preparation.

Public Involvement

We will discuss public comment provisions in more detail at future opportunities. At this time we wish to simply point out several basic principles

which should govern public involvement programs. First, the opportunities for public involvement should be formal and well-defined. The groundrules shouold similarly be explicit and well understood by all participants, including BLM personnel. We feel that strictly informal public involvement activities--while they should also be encouraged--can lead to frustration if used exclusively. We believe public participants are likely to participate more productively if the groundrules are well understood in advance. In addition, public outreach to encourage participation must be affirmative. It should include multiple methods of adequate public notice, dissemination of background information (such as RMPs, meeting agendas, etc.), and access to additional information or technical assistance if necessary to assure intelligent dialogue. The participant must know that his or her participation has an impact both through feedback and through due process. Finally, an appeals process is required to the most politically accountable level, the Secretary, which allows anyone adversely affected by a decision the right to make an administrative appeal.

Start-up considerations

Program design has serious shortcomings, but even with the recommendations included herein, the program is meaningless if its major environmental protections will not apply for several years. The real tragedy results because of the Department's rush to commence leasing in 1980, despite considerable evidence that such early new competitive leasing is unnecessary. The short cuts proposed to meet early lease sale dates include:

Application of the LUC before their final version
Use of existing resource inventories and MFPs for land use decisions
Only a partial production target exercise
A shortened regional sale EIS time frame.

The most serious of these are premature application of LUC, which we have already discussed, and the use of existing land use plans and data. On the latter point, where the FLPMA planning regulations allow the use of existing plans for up to fifteen years (1601.6-3(c)), the least we would recommend is establishing a

maximum five year deadline for the initial revision of existing MFPs and adoption of new RMPs. In addition, the department and the DES should evaluate the alternative of delaying competitive leasing until new RMPs have been adopted and resource inventories have been completed, relying in the interim on emergency, short-term or bypass leasing subject to existing MFPs and the additional land use constraints added by the preferred alternative after the finalization of the ES.

We now turn to analyze the preferred alternative in more detail through comments on the Example Regulations, DES, Appendix A.

I. COMMENTS ON THE EXAMPLE REGULATIONS

Through these comments on the example regulations, Friends of the Earth intends to illustrate and expand on some of the points raised elsewhere in our response to the Draft ES. We are therefore concentrating on a few select portions of Parts 3400, 3420, 3427, 3450 and 3461. Failure to discuss any portion of these regulations does not imply approval.

PART 3400 - COAL MANAGEMENT - GENERAL. We are pleased that the Department has seen fit to draw together all regulations relating to coal leasing in one section and to set out clearly the responsibilities of various Departmental offices.

3400.0-4(d)(2) We do not believe that the Fish and Wildlife Service can adequately meet its responsibilities under 3400.0-4(d)(1) to "exercise the authority of the Secretary to protect and conserve endangered and threatened species, migratory birds, eagles, other fish and wildlife" if it can only "recommend" lands unsuitable for leasing "due to fish and wildlife and related ecological values." The statutory responsibility of the Secretary, delegated to F&WS requires that it be granted the authority to designate lands unsuitable where the "protection and conservation" of fish and wildlife is involved.

3400.0-5(p) The last sentence should be dropped. The first sentence adequately describes fair maket value and neither compells nor denies the consideration of payments to a surface owner for consent to enter. The reduction of payments to the United States because a mine operator has paid for the right to enter raises a host of legal and policy questions. Improperly allowed, it can lead to a situation in which competing resource values on land proposed for lease are totally ignored or undervalued. Consider, for example, a situation in which Tract 1 has coal values of X and other resource values of Y (presumably less than X, but in this instance set at .6X), Tract 2 has coal values of .7X and

other resource values approximating 0. It appears to be in the public interest for Tract 1 to continue without mining and for Tract 2 to be mined. The total social value of this path is 1.2X (.6X from Tract 1 and .7X from Tract 2). If no allowance for surface owner payments is made, this will also be in the mine operator's interest; he will reap his margin of profit on a total resource of .7X from Tract 2, whereas he would only reap that same margin of profit on a total resource of .4X from Tract 1 -- the coal resource value of the tract minus a payment to the surface owner for the true value of the resource forgone. If Tract 1 is mined the total social value will be only .4X -- the value of the coal resource made available minus the value of the competing resource forgone. However, if the mine operator is allowed to deduct the cost of paying for surface owner consent from his costs, then it becomes in his interest to lease Tract 1, because he is able to turn his profit on the entire coal resource value without having paid for the loss of the other values; that payment is made up out of money he would have paid the United States anyway, i.e. the government subsidizes the destruction of resource value Y from its own revenues.

This example is simplistic, but it does indicate some of the problems involved in allowing payments to surface owners to be considered in assessing the fair market value of the lease. Unfortunately, because the issue has generally been cast in the context of a greedy land owner holding out and extorting payment, there has been little realization, and no discussion in the Draft ES, of the function that surface owner payments perform in indicating the value of alternative uses of a prospective lease site.

We believe that no allowance to reduce the fair market value of a lease to reflect payments to surface owners should be made absent the development of an explicit set of rules and an economic and environmental analysis of the effect of the application of such rules.

3400.0-5 (tt) This section should also contain a definition and explanation of the structure of the "negative consent" described in 3420.2-3(d)(1).

3400.3-1 This section, which we fully support, seems to be somewhat in conflict with 3420.2-5 which only requires BLM consultation with the surface management agency "to obtain its recommendations as to the acceptibility for further consideration for leasing of the land that the other agency administers." The latter section should be amended to indicate the discretionary authority of the surface mangement agency to refuse either leasing or planning for leasing on land which it administers.

3400.3-3 This provision can be improved in two ways. The first is to require a formal finding by the Secretary of Agriculture for decisions under 3400.3-3(b)(2). The second is to provide some method of appeal or protest, within the Department of Interior, when it is alleged that the finding can not be sustained. An alternate way of achieving the same result -- providing review of facts in contention when the decision is made by another agency -- might be to allow DOI to lease under these conditions only when such leasing was in accord with a program plan developed under the Forest Management Act, thereby allowing the issue to be contested within the context of DOA's planning rules. What we wish to avoid is a situation in which a potentially momentous decision, to lease in a National Forest for strip mining, is made without a requirement of environmental analysis and an opportunity for review.

Subpart 3420 - Competitive Leasing. This subpart provides a mechanism for implementing most of the Preferred Alternative. It is subject to criticism in two broad areas: first, were it implements aspects of the Preferred Alternative which we found flawed, second, where it fails to implemet properly important aspects of the Preferred Alternative.

3420;1-5 The term "land use analysis" is nowhere defined in this Part. A definition of the term is found in Section 1601.0-5(g) of the proposed planning regulations to implement the Federal Land Policy and management Act 43 FR 58768 (December 15, 1978):

> "Land use analysis" means the process authorized in the Federal Coal Leasing Act Amendments Act of 1976. It is an environmental assessment supplemented to include all data relevant to a decision. It is used only when public land resources are limited as prescribed under § 1601.6-4. It is generally limited to a much smaller area than a resource area since the process can be used only where very limited public land resources are involved. It generally covers one or two types of public land resource use. Upon approval, it meets the land use planning requirements of Sec. 202 of the Federal Land Policy and Management Act.

Section 1601.6-4 of the same proposed regulations is entitled "Situations where action can be taken based upon another agency's plan or land use analysis." It deals with three specific situations: where BLM administers only the mineral or subsurface estate and the surface is administered by another Federal agency; where BLM administers only the subsurface or mineral estate and the surface is non-Federal; and where BLM shares surface and/or subsurface estate with another Federal agency, as in a military withdrawal.

A reading of the two proposals together -- and they were published at the same time -- would indicate that "land use analyses" could only be used in very limited circumstances. Presumably, in all other cases a comprehensive land use plan, as defined by Section 202 of FLPMA, would be required before a lease could be issued.

However, it is clear from the actions the Department is taking in running "tests" on unsuitability criteria and preparing for the leasing of up to forty tracts by next Summer, that it intends for "land use analysis" to have broader use than would be indicated by the langauge

of Section 1601.0-5(g). Certainly, it would otherwise be impossible to undertake LUA's in the Powder River Basin or Uintah Regions where BLM manages the bulk of the surface estate.

We are utterly opposed to the use of a short-cut, single focus process to drive the bulk of the Department's lease planning process. In most instances, these LUA's will supplement MFP's developed during the pendency of the EMARS program. The entire thrust of FLPMA was to eliminate this type of single resource oriented planning and replace it with multiple-use planning accomplished in the open with a maximum amount of public participation.

In a perfect world, no coal should be leased unless a post-1976 FLPMA plan has been prepared. An imperfect world may require short-cuts, but they must be carefully hedged and clearly limited in time and scope. This the Preferred Alternative and the Example Regulations fail to do. Coal leases covering billions of tons and stretching into the decade after next could be governed by LUA's under the proposed Parts 1600 and 3400. There is no warrant for such action. If there is a need for "start-up" criteria -- which we doubt -- that need should be fixed in time and extent. There should be some point certain after which LUA's will not be an acceptable alternative to Section 202 plans; there must be a maximum acreage which can be subject to coal leasing under such limited planning efforts. We strongly urge the Secretary to see that such limitations are contained in the Proposed Regulations to be issued next month.

Furthermore, the Proposed Regulations should contain a fuller description of exactly where the LUA's are not required to meet the full requirements of Section 202. We are most concerned with the public notification and participation aspects of the land use planning effort. It is noteworthy that 3420.2-3(b)(2) requires public participation

where the Secretary applies unsuitability criteria to lands covered by another agency's plan. 3420.2-3(b)(1), covering the application of the unsuitability criteria within the FLPMA planning process contains no such explicit statement. Of course, during a full-blown Section 202 planning effort such participation is mandated. But what about during a LUA? Or during the "tests" of the unsuitability criteria right now going on for use in the first lease sales ? The Example Regulations do not give clear answers, either to the public or to Departmental employees who will be charged with administering the process.

Likewise, nearly every element of the Preferred Alternative, no matter how admirable in concept is subject to questioning and doubts about its efficacy in implementation, because there is a legitimate question concerning just which aspects will be operative during the pendency of the LUA's. The Proposed Regulations must provide some definitive guidelines.

3420.2-3 Lands acceptable for further consideration for leasing. This section embodies the heart and soul of the Preferred Alternative -- the four "screens" which were the subject of so much discussion during the last year. The concept is admirable and worthy of strong support. We are deeply supportive of the idea that certain essential environmental and social factors should be used to eliminate lands from consideration before any energy resource considerations are even applied. Clearly, if there is a resource for which such treatment can be justified, it is coal which is in such abundance.

Unfortunately, the four screens, so sturdy in rhetoric, have been torn and breached in their regulatory mounts. The lands unsuitable criteria will be discussed at length below. We find them to be sadly lacking in content.

The third screen, multiple use trade-offs, has been most severely savaged. Originally presented as a way of guaranteeing that other valuable lands uses need not fall victim to the need for relatively abundant coal resources, it has been reduced to a near nullity, "Multiple land use decisions may be made eliminating coal areas from further consideration for further leasing to protect other resource values of a unique, site-specific nature not included in the unsuitability crrieria discussed in paragraph (b) of this section."

The Draft ES presents an even harsher test. After first falsely asserting that the lands unsuitability criteria would address most major conflicts between coal and other resources, it goes on to say "The adjustments at this stage in the land use planning process would be made to accomadate unique, site specific resource values clearly superior to coal.." (DES, 3-21 emphasis added) Not only is this test unwise, but it seems to be illegal, flying directly in the face of the multiple-yield concept underpinning FLPMA.

Coal has become a monculture. Unless a resource can be shown to be clearly superior, it will not be protected, regardless of the fact that the resource might be relatively rare or not easily replaced while the next valley could easily contain just as much coal.

It is doubtful that 3420.2-3(c) could remain so restrictive in the Section 202 planning process. The imperative of FLPMA demand a wiser test. Its effect under LUA planning, however, could be quite detrimental. The situation is made worse because the Activity Planning regulations nowhere explicity address the issue of resource trade-offs.

3420.2-3(d)(2) manifests a weakening in the fourth screen, surface owner consent. The expression of a preference against leasing by a significant

number of surface owners is no longer sufficient to bar surface leasing in the area, if it is needed to meet regional production targets. Based on the type of regional projections displayed elsewhere in the Draft ES this criterion could effective justify overlooking surface owner preferences throughout large areas in the West, particularly in the Powder River Basin. This would seem to contradict the spirit and, perhaps, the letter of Section 714(d) of P.L.95-87 which states that, "The Secretary shall, in his discretion but to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining techniques in those areas where a significant number of surface owners have stated a preference against the offering of the deposits for lease."

One final comment on the land planning mechanism adopted in part 3420.2 is that it seems to have continued the Department's recent policy of ignoring its responsibilities under FLPMA for the "prompt development" of regulations and plans for the protection of public land areas of critical environmental concern (Section 102(a)(11)) and the priority preparation of an inventory of public land values "giving priority to areas of critical environmental concern" (Section 201(a)) The vagueness of the LUA process, along with the failure to confront the issue in the FLPMA planning regulations, leaves serious questions in our minds as to how well the coal-related planning effort will operate to insure the protection of these important areas.

3420.2-4 Because the land use and energy decisions involved in the coal leasing program are national in scope, the phrase "who may be adversely affected" should be deleted. Section 202(f) of FLPMA establishes public involvement procedures with no mention of such a test.

3420.2-5 As noted in our earlier comments on 3400.3-1 there appears to be a conflict. While we would hope that other agencies would cooperate

when coal leasing does not seem inconsistent with the statutory guidelines under which they administer the surface, it seems counterproductive to plan for the mining of such land where the agency will be able to deny any leasing. It also might lead to some distortion of the process down the road if tracts were included in the planning process as potential coal lease sites when there was no possibility of this occurring.

3420.3 "Regional production targets" The regulations on the formulation of regional production targets and their role in the tract selection process are well-reasoned. However, because the targets developed in this Draft ES struck us as so unreasonable, we believe that several explicit changes in the process by which they are developed may help produce better results in the future.

Target setting is essentially a computer exercise; once the runs are done it is difficult and expensive to take another course or examine other alternatives. We suggest that the following paragraphs be inserted in appropriate places in the Regulations:

"Prior to undertaking any projection of regional coal needs, the Secretary shall solicit from the public, industry and professionals comment and suggestions on the best modeling techniques to use, appropriate assumptions and relevant data which may have a bearing on regional and national coal needs."

"In determining regional coal needs and projected demands, the Secretary shall endeavor to develop data based on actual end-use needs and on the broadest feasible survey of major sources of production and demand and their coal-related plans."

"The Secretary shall develop information to indicate the economic social and environmental impacts of failing to meet given regional

targets or exceeding them, whenever it appears likely that combined Federal and non-Federal actions, including the development of existing leases, are likely to achieve either result for a region."

3420.4 Activity Planning. If, as seems likely based on conversations with Departmental officials, the four screens in the delineation of lands acceptible for future leasing do not remove a high percentage of the 25 million acres that will be subject to the coal management process, then the activity planning phase will have the most significant land use implications. We do not believe that the existing procedures embodied in the activity planning phase of the program are well designed to assist in rational land use planning.

3420.4-2 The expression of interest should provide for negative nominations. This is particularly important if planning has been accomplished under LUA procedures and if the multiple land use decision mechanism remains inconsequential. Negative nominations should be solicited after industry expressions.

3420.4-3 The preliminary tract identification should contain an inventory of existing and potential uses of the tracts.

3420.4-4(a) The description of the tract ranking process is vague and too short. It does not indicate who shall do the ranking. It does not indicate whether the ranking is a managment decision implementing a land use plan (assuming there is one) and thereby governed by the FLPMA regulations, including those on appeal, or some other type of decision. It gives precious little guidance on how the rankings shall actually be done and which critieria are critical.

3420.4-4(b) The ranking process seems to be an appropriate point at which to apply the threshold criteria discussed at 3.2.1.4. The Draft ES notes that "It is not necessary to specify threshold in the land use plan," (DES 3-21) and we agree that while it might be desirable, it is by no means always possible to do so. If threshold criteria are specified

in a land use plan, then they should be controlling on tract selection. (We would appreciate the Department's views on whether this supposition is correct and to what degree) But if there are no threshold criteria in the land use plan (or where a threshold issue exists that was not dealt with in the plan), then it is necessary that the program specify some point in the process where the Federal land manager face an affirmative duty to consider threshold issues. It seems reasonable and appropriate to make decisions on threshold issues just prior to or concurrent with the selection of tracts to offer for sale.

We hope that the Department will take the lead in further investigating the complexities associated with threshold questions in the coming months. We believe that the Final ES will benefit from a fuller discussion of this issue and that such an investigation may also shed some light on the best way to integrate such decisions into the coal managment program.

3420.4-4(b)(3) This data should also be made available in Washington D.C. Its high time that the Department started to centralize important land use data.

3420.4-5 Environmental Assessment. This section apparantly contains directions for all environmental assessments in the coal management program other than the programmatic environmental statement which is covered in 3420.3-4. The following principles should govern the environmental assessment strategy of the coal management program:

1. There must be site specific environmental assessments (which we presume would almost always indicate the need for an environmental statement) for each mine plan on Federal lands.

2. The regional lease sale environmental statements should evaluate regional and cumulative impacts based on proposed and existing activities, including the mine plans.

3. There must be environmental statements on all MFP revisions, particularly those undertaken in response to the coal management program.

4. The regulations need to present standards for the collection of baseline data and for the compilation of Section 201 inventories that will be adequate for land use planning and the preparation of environmental statements. Special standards should be developed to deal with data needs which will arise in the updating of MFP's originally prepared before the passage of FLPMA and FCLAA.

It is not necessary that every step in the coal management program require and environmental statement or that each environmental statement must seek out and assess new horizons of information. A comprehensive environmental assessment strategy will facilitate the tiering of environmental statements and promote a pattern of decision making dependent on the exisitence of appropriate data generated under an ongoing process.

In our view, NEPA and FLPMA clearly mandate the preparation of environmental statements when land use plans are developed or significantly altered and when mine plans are approved. The coal management program may and should supplement these statements with regional lease sale environmental statements. But we see no Secretarial authority which will allow the regional sale ES to substitute or replace land management environmental statements or environmental statements on the approval of specific mine plans.

Sound environmental assessment strategy can reduce the burden on the Department and the public by integrating the data collection and presentation functions performed by these statements , but it can not eliminate the requirement that environmental assessment be undertaken at these three separate points in the coal and resource management program of the Department.

3427 Surface owner consent. The rights of a surface owner of land overlain with coal were among the most bitterly disputed points in the long battle to pass adequate stripmining legislation. The Example Regulations contemplate the erosion of Section 714 protections in several places, for example in 3420.2-3(d)(2). Another relaxation of the protection of surface owner rights is found in 3427.2(g) which allows the State Director to conduct the sale of a lease for coal on split estate lands where no consent has been granted.

We can not overstress the importance of deleting this pernicious provision. This subpart provides ample opportunity for prospective lease purchasers to negotiate the purchase of consents. If they are not able to do so within the stipulated time frame, then the tract should not be subject to lease sale.

Subsection (g), on its face, would not only allow a lease sale in situations where the surface owner has not expressed a final preference for or against selling his rights, but also where a definite expression of a desire not to consent has been indicated.

It must be remembered that 3420.2-3(d)(1) does not require that lands for which a negative consent is given be removed from consideration for surface mining, nor does 3420.6 require the Secretary to honor such indications when establishing the regional coal lease sales schedule. If, by the date thirty working days before the scheduled sale, a prospective lease purchaser is not able to secure a written consent or, at the very least, a written statement that the surface owner has no objection to the sale going forward, then it should not take place.

3461. The Federal Lands Program, Lands Unsuitable Criteria. The lands unsuitability criteria are the backbone of the environmental component of the coal management program. A well-defined and designed program for designating lands unsuitable for mining could insure the exclusion of most lands containing other important values from consideration for leasing. Presumably, the automatic application of the criteria would enable even environmentally insensitive land managers to make the proper choices.

The criteria presented in the Draft ES fail to attain the ends suggested in the preceeding paragraph. They are set forth in vague terms and subject to equally vague and generally broad exceptions. They provide neither certainty nor the protection of valuable resources. In some instances, there are inexplicable limitations on protections.

The vagueness, the exceptions and the limitations might, in some instances, be justified, but there is no information in the Draft ES on which to make any judgement. The public is left totally in the dark on the likely extent and impact of many of the criteria. How many National National Landmarks or inland lakes are located within KRCRA'S? This information -- or at least a good approximation -- could have been gathered and presented in the Draft ES, but was not. This makes it much more difficult to critique the criteria or to understand why some are presented as they appear in the Example Regulations.

The following aspects of the proposed criteria need change:

1. In criteria #1, there is inadequate development of the notion of an "appropriate buffer" zone. While some buffer zones must be determined on a case-by-case basis, it is not unreasonable for the Department to establish some general guidelines and put them out for public comment. For example, the Department might consider establishing, by regulation,

minimum buf[illegible] zones around parks and wilderness areas based on mine size.

4. We find no justification for the establishment of new leases in wilderness study areas. There should be no exception.

5. The value of this criteria depends on the value and quality of visual resource management analysis. It does not seem feasible that surface mining would not "significantly diminish or adversely affect the scenic quality" of any Class I or Class II area. We recommend that the exception be deleted.

6. Exception (ii) should be deleted. It is not clear what expertise BLM has to second-guess a non-concurring researcher. As the studies only last for the duration of a permit, this would not result in permanently removing land from consideration for leasing. They would become available when the existing research was completed.

7. It is a comfort to observe that mining may annihilate historic lands and sites of merely local or regional significance only if the State concurs. Presumably exception (i)(B) applies only to the establishment of a buffer zone, e.g. the consultation is over how close the mining can come, not over whether the mining can take place on the site itself. This should be made clearer.

8. Exception (iii) should be deleted. The theory of this exception seems to be that the operators of giant earth movers and draglines will be able to spot paleontological resources. This is nonsense.

Exception (ii) should require the concurrence of the authority responsible for the designation in the finding that the mining will not have significant impact.

9. The determination of critical habitat must be made by the Fish and Wildlife Service alone. It is not BLM's job to determine what is and what it not critical habitat. The exception must be rewritten to require F&WS concurrence.

Friends of the Earth would like to stress that this is one of the most seriously flawed criteria. It is not credible that mining will not affect habitat. The exclusion of land from mining or the setting of lease terms to minimize potential harm requires the application of professional expertise which resides with F&WS. Any attempt to place decisions on critical habitat elsewhere in the Department would be a serious error.

10. We believe that concurrence with the State agency is required.

11,12. The decision on adverse impact should be made by the Fish and Wildlife Service.

14. We would delete the joint determination, leaving it to F&WS. Similarly, any exception should require concurrence.

15. As with the previous criteria, we have difficulty supporting a joint determination of critical habitat. Both exceptions are badly drawn. Exception (i) posits the existence of a situation which is impossible; exception (ii) does not provide an adequate role for the State agency.

The wording of exception (ii) may also render the criteria meaningless. With the exception of species which now exist only in zoological parks, almost no area desirable for coal mining is singly and uniquely so important that its use for mining will adversely affect the species. The language should be changed to indicate that there will be no adverse impact on the animal population which the State has chosen to protect.

16-19. These four criteria pertaining to water resource conflicts raise serious problems concerning the role of BLM in resolving water-related conflicts. Exception (p)(ii) should be deleted. Exceptions which give BLM the authority to permit leasing if it determines that the action will have no adverse effect on water resources assume a great deal about the competence of BLM to assess hydrology. We suggest some formal role for U.S.G.S. and the Water Resources Council in any such determinations.

20. The criterion should require the initial classification of all lands which meet the SMCRA definition of "prime farmland" plus any additional which the land management agency and USDA agree should be so treated. Exemption (ii) should be deleted.

21. This criteria should be redrafted to make it clear that any mining operation, whether within or outside an AVF, which has an adverse impact on water quality is prohibited. Not only should the exception reflect this, but it should also specify what constitutes interruption, discontinuance or preclusion.

22. This criterion appears to be inverted. It implies that leasing will go forward until such time as it is demonstrated that reclamation can not be achieved. In the present situation, a requirement that Western reclamation be demonstrated might well bring any Federal coal leasing program to a screeching halt. However, this criterion should require more than passive acceptance of ignorance on the part of the Department.

The Department should seriously consider establishing certain mandatory criteria for declaring land nonreclamable based on rainfall, soil type, terrain etc. and then indicate that it is willing to consider arguments that land covered by such criteria is, in fact, reclamable when preparing land use plans for the affected region.

23,24. In both cases we believe that where a State has established a procedural structure to protect its lands, any Federal action on Federal lands which threatens that level of protection should only be undertaken with the concurrence of the relevant State authority.

Received 2/22
2/13/79
by OMB

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CARL E. BAGGE
PRESIDENT

February 13, 1979

Honorable Frank Gregg
Director, Bureau of Land Management
Office of Coal Management, Room 3610
Main Interior Building
18th and C Streets
Washington, D. C. 20240

SUBJECT: Comments Upon Draft Environmental Statement Entitled "Federal Coal Management Program"

Dear Mr. Gregg:

I attach hereto the comments of the National Coal Association upon the draft environmental statement "Federal Coal Management Program," published for comment by the Department of the Interior ("DOI") on December 15, 1978.

In accordance with the suggestions appearing at pages 3-1 and A-1, our comments are addressed primarily to the statement itself (the "DES") and the "preferred program" (the "Program") which it describes. Although we address in passing the "Example Regulations" included as Appendix "A", we will comment in greater detail when such regulations are hereafter formally published as proposed rulemaking.

We have also reviewed selected documents used during the Department's formulation of the Program. These include: the Secretarial issue papers; narrative descriptions of the ongoing process prepared by Departmental staff; Instruction Memorandum No. 79-76 of November 8, 1978, from your office to several Bureau of Land Management State Directors; and a Notice entitled "Coordination of Federal Lands Review..." published on December 8, 1978 at 43 F.R. 57662 et seq. Our comments address these also.

We find discrepancies between and among these various documents, which we feel are important to resolve in order correctly to understand the Program. This is

especially true with respect to such significant elements as the proposed mechanisms for designating lands unsuitable for surface coal mining, the timing and effect of industry input to the planning processes, the role which production "targets" will play in determining leasing levels, and the nature and use of the concepts of "fair market value" and "maximum economic recovery."

GENERAL COMMENTS

At the outset, I would like to congratulate the Department of the Interior ("DOI") upon the quality of the DES. It is clearly a thoughtful and conscientious attempt by the draftsmen to set forth a proposed program, the nature of the alternatives thereto which were considered by the Secretary, and such regional and national environmental and other impacts as are required to be set forth in order to comply with applicable laws and regulations. These include Section 102(2)(C) of the National Environmental Policy Act of 1969 ("NEPA"), 42 U.S.C. 4332(2)(C), the Guidelines of the council on Environmental Quality ("CEQ"), 30 CFR Part 1500, as amended ___F.R._____; the relevant DOI regulations issued pursuant thereto; and the Order of the Court in NRDC v. Hughes, 437 F. Supp. 981 (D.D.C. 1977), as amended 454 F. Supp. 148 (1978).

I must also note, however, that in our view the DES in its present form is not complete. It does not adequately set forth the full range of possible consequences that would result from adoption of the Program. Some alternatives to the Program which were considered by the Secretary should be more fully described, and there are other available courses of administrative action open to the DOI which should be more clearly articulated as discrete alternatives to the Program or the elements thereof.

Our attached comments identify these and other deficiencies in greater detail. We believe they are the inevitable result of the fact that the document is only a "draft" environmental statement, and that the overall consideration given to the Program and its alternatives constitutes full compliance with all legal requirements applicable to such a document.

We also feel that the adoption by the Secretary of any or all of the recommendations set forth in our attached comments, accompanied by appropriate explanation in the final statement, would fall well within the range of alternatives covered in the DES, and would comply in all respects with the requirements of NEPA.

SPECIFIC COMMENTS

Our attached comments address in detail the following major difficulties which we have with the preferred Program:

Industry Input

As now drafted, no timely or meaningful input would be sought from industry to identify those areas of federal coal lands which are most desirable for immediate development. The coal industry will continue to be the developer of whatever land areas are leased (DES 3.1.8, at 3-14). Such input in the land use planning process would serve to focus DOI's attention on those areas which should receive priority review for lease potential. This would be especially important in the early rounds of resumed lease offerings, but would involve no derogation of the Department's other or subsequent planning responsibilities.

Departmental Resource Limitations

We believe the land use and activity planning processes of the Program exceed the DOI's current or foreseeable data and manpower resources. As a result, we do not believe the Program could be implemented in any reasonable timely fashion. Those elements which would be particularly troublesome are, moreover, either unnecessary for successful implementation of a leasing program, or might be substituted for by other available alternatives.

Specific Program Elements

We believe several specific elements of the Program are either unworkable or needlessly complex. These include, among others:

- Lands unsuitable procedures and criteria.
- Multiple use trade-off procedures.
- Split estate treatment, and private surface owner veto power over leasing.
- Intertract bidding mechanisms and tract ranking procedures and priorities.
- Impossible requirements for the determination of specific lease terms and conditions, including fair market value and "maximum economic recovery."

We believe that the specific deficiencies of these program elements, and more efficient administrative alternatives, would have been immediately identified if the Department had complied with the provisions of the President's Executive Order No. 12044 dated March 22, 1978, and conducted a Regulatory Analysis of the Program. Although DOI has not published Final Rulemaking to implement this Order, compliance would clearly be required by application of the principles set forth in the proposed rulemaking published on May 25, 1978 at 43 F.R. 22573. (See, especially, proposed 14 CFR 14.3(c)(1), (3), (4) and (5).) In view of the importance of administrative mechanism choices to the success of any new program, a Regulatory Analysis should be undertaken before final decisions are made.

Application to Existing Rights

We do not believe the Department to have the authority assumed in the Program to apply its new "suitability" criteria to existing but non-producing leases and to the preference right lease applications (PRLAs) now pending before the Department. To the degree that the Program would cancel or nullify an existing lease or PRLA, the taking of a valid existing right may be involved. This issue is currently in litigation, and adoption of this Program element should await judicial resolution of the nature of the rights involved. To the extent that the Program proposes the exchange or substitution of other rights for any so taken, it would appear to exceed existing statutory authority. At a minimum, specific legislative proposals should be addressed and the alternatives thereto considered in the final statement.

CONCLUSION

The preferred Program represents an unprecedented degree of management and control at the Departmental level of federal coal resources. Many specific elements of the Program are unworkable. If implemented, we believe it would be impossible for the Department or the private sector to achieve in timely or responsible fashion any realistic goal of resumed federal coal leasing.

The unworkable aspects of the Program appear in virtually all respects to be actions or choices within the discretion of the Department. They are not mandated by external constraints of law or national policy. As a result, the Program would appear to represent the conscious adoption by the Department of a land management policy which is systematically biased against federal coal development.

We do not believe that this result is consistent with the intent of the President, the public interest or the national policies established by the Congress in relevant legislation.

We urge the Department to reconsider and amend the preferred Program, so that the nation may have the benefit of the timely, orderly and environmentally sound development of the vital domestic energy resources represented by unleased federal coal lands.

We look forward to the efforts the Department will be making in this regard, and would be willing to assist you or your staff in any way possible. If you have any questions or comments upon the enclosed detailed analysis, please do not hesitate to call upon us.

Very truly yours,

Carl E. Bagge

Received 5:22
2/13/79
by Chuck Roh

DETAILED COMMENTS

OF THE

NATIONAL COAL ASSOCIATION

UPON

DRAFT ENVIRONMENTAL STATEMENT

FEDERAL COAL MANAGEMENT PROGRAM

AND

STATEMENT OF POLICY,

"COORDINATION OF FEDERAL LAND REVIEW"

(43 F.R. 57662, DECEMBER 8, 1978)

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DETAILED COMMENTS OF THE NATIONAL COAL ASSOCIATION UPON THE DRAFT ENVIRONMENTAL STATEMENT, THE PREFERRED PROGRAM AND ALTERNATIVES DESCRIBED THEREIN, AND THE POLICY OF THE DEPARTMENT RELEVANT THERETO.

I. GENERAL COMMENTS

Achievement of national environmental economic and energy self-sufficiency goals requires the orderly development and use of domestic energy resources, at the lowest unit energy cost, consistent with other national policy.

There is now a demand for new federal coal leases, evidenced by the response in 1976 to the call by the Department for federal coal lease nominations. Federal studies by the Department of Justice and the Federal Trade Commission have affirmed the anti-competitive effects of the current moratorium.

Existing federal laws and applicable Departmental regulations ensure that the development of future federal coal leases will only occur promptly, and only under acceptable environmental conditions.

Resumed federal coal leasing is, thus, presumptively in the national interest. No valid reason exists for the continued moratorium on federal coal leases. A program should be adopted which would encourage and efficiently implement the issuance of new federal leases.

Unfortunately, and as set forth more fully below, the proposed program (the "Program") set forth in the draft environmental statement (the "DES") would appear to represent the adoption of a resource development policy incorporating a systematic bias against such federal coal development. It would relegate development of federal coal to a status procedurally and substantively subordinate to the development of all other resources found in coal bearing federal lands.

Many of the major deficiencies of the Program derive in our view from a conscious or unconscious effort by the draftsmen to use the mechanism of the federal coal lease to address and resolve all of the many issues raised by the inevitable inconsistency conflict between and among competing national goals and policies. To impose such a heavy burden upon any single federal mechanism or device is simply not possible.

As exemplified in the Program, such an effort would in fact frustrate any goal of timely, resumed federal coal leasing. It would impose unnecessary costly and inflationary burdens upon the administering agency, the lessee and, through the consumers of the energy resources involved, upon the general public.

Our comments are intended to identify those aspects of the Program which would most seriously inhibit its implementation. In each such case, we identify specific changes in or administrative alternatives to the Program which we believe would in all cases be fully consistent with applicable laws and the national policy, and which would reduce or eliminate these adverse effects. Adoption of any or all of our specific recommendations would be within the scope of the alternatives and issues covered in the DES, but to varying degrees would require explanation or amplification in the final statement.

For brevity, throughout the following comments major applicable laws and regulations may be referred to by their commonly accepted acronyms. These are: the Federal Coal Leasing Amendments Act of 1976, P.L. 94-377 (S. 391) 30 U.S.C. 181, note, as amended ("FCLAA"); the Federal Land Policy and Management Act of 1976, P.L. 94-579 (S. 507), 43 U.S.C. 1701, note, ("FLPMA"); the Surface Mining Control and Reclamation Act of 1977, P.L. 95-87 (H.R. 2), 30 U.S.C. 1201, note, ("SMCRA"); the Department of Energy Organization Act of 1977, P.L. 95-91, 42 U.S.C. 7101 ("DOE Act").

SPECIFIC COMMENTS

A. LAND USE PLANNING PROCESS

Section 3.2.1 of the DES, "land use planning," discusses in significant detail the various steps by which land use planning would occur under the Program. After correctly noting that FLPMA requires the use of "multiple use and sustained yield concepts," (DES, at 3-18) the discussion in this section describes a three step process whereby "the maximum potential for developing, preserving or enhancing each resource" would be identified, and conflicts would be "resolved so that final decisions can be made... /T/he resulting land use plans identify preferred land uses, or combinations of uses, for the area and serve as guides to the federal land managers. The land use plans establish the nature, extent, and objectives for future actions and programs on BLM-administered lands." (Ibid.)

1. The Program Involves Unnecessary Delay in Leasing.

At the outset, we assume that if the Secretary should determine in his final decisionmaking that the resumption of federal coal leasing is appropriate, the national interest is best served by adoption of a leasing program which will be able to be implemented in the most efficient and timely manner.

In this light, we strongly question the wisdom or efficiency of requiring that all unleased federal land areas be subject to review by the BLM at the beginning of coal related review in the management framework planning process. The budgetary and personnel resources of the Department or, for that matter, of the Federal government itself are limited.

Section 202 of FLPMA requires that the management of federal lands be accomplished through an orderly land use planning process. Section 3 of the FCLAA amended Section 2(a) of the Mineral Leasing Act, so as to provide in new Subsection 3(A)(i) thereof that no lease sale may be held "unless the lands containing the coal deposits have been included in a comprehensive land-use plan." Ultimately, therefore, comprehensive planning for federal lands, including coal related planning for federal coal lands, is required under present law. However, neither FLPMA nor other relevant Federal statutes,

including the FCLAA, require that coal related planning for all federal lands be completed before a coal leasing program is initiated or a specific coal lease offering made.

To the contrary, the legislative history of the FCLAA indicates that it was the express intent of the Congress that resumed federal coal leasing need not be required to await the completion of land use plans for all federal lands, or even for all federal coal lands.

On June 21, 1976 the Senate passed S. 391 of the 94th Congress, and forwarded the FCLAA to the President for his approval. During the period of Presidential review, the principle proponents of the legislation in both the House and the Senate wrote to the President, setting forth their views with respect to the intent of the Act. By letter dated June 24, 1976, Senator Lee Metcalf and Congresswoman Patsy Mink specifically addressed several concerns which had previously been expressed by the then Secretary of the Interior Thomas S. Kleppe. These concerns included the fear that if completion of land use planning efforts were to be required before resumed federal coal leasing could take place, any such leasing would be significantly delayed.

The Congressional sponsors assured the President that S. 391 was designed to "insure development of Federal coal on a timely basis." Letter, Hon. Lee Metcalf, Hon. Patsy T. Mink, to the President, June 24, 1976, 42 Cong. Rec., p. E3667 (Daily Edition Ed., June 29, 1976), reprinted at p. 111, Senate Publication No. 95-77, "Federal Coal Leasing Policies and Regulations" (January, 1978).

Moreover, in introducing this letter for the record, Senator Metcalf noted on the floor of the Senate on June 29, 1976, that:

> "I wish to make it very clear on record, Mr. President, that at no time in the consideration of S. 391 has there been any intention by the Congress to prevent new lease sales by the Secretary until all Federal coal lands have been evaluated. The unmistakable purpose of this bill is to facilitate the production of coal from Federal lands in a manner that is fair to both the lessee or coal operator and to the public who owns the coal....there is no requirement that all known Federal coal resources be evaluated before any can be leased." Ibid.

This letter and expression of Congressional intent is especially compelling legislative history, in light of subsequent events. Notwithstanding the direct appeal and reassurance of Senator Metcalf and Mrs. Mink, on July 3, 1976, the President vetoed S. 391. A Senate Staff analysis of the President's veto message was prepared, for use by the Congress in its override deliberations. That analysis noted:

> "S. 391 essentially codifies /the Department's existing coal evaluation program/ by directing the Secretary "to evaluate...the known recoverable coal." The size and timing of this evaluation are left to the Secretary's discretion. The program would not preclude the Secretary from issuing coal leases where he believes he already has adequate information about the nature and extent of the coal, nor would it require that all known Federal coal reserves be evaluated before any coal is leased." Ibid at 135.

Following all of the above, each House voted to override the President's veto, and S. 391 became Public Law 94-377 on August 4, 1976.

Since each House voted separately to override the President's veto following each of the above expressions of the intent of the Congress, each such expression must be read as fully ratified by the Congress itself. The legislative history is thus clear and compelling that Congress did not intend resumed federal coal leasing to await completion of all land use planning.

The Program as now described would, however, require that all federal coal lands be reviewed and evaluated for both the mineral deposit and the applicability of criteria for designating lands unsuitable for mining, before any lease offering may be made.

The completion of the evaluations and screening processees contained in the Program will be time consuming. The delay this represented by the land use planning process outlined in the Program is both unnecessary and contrary to the intent of the Congress. To the degree that completion of the Program's process involves the detailed analysis and review of areas as to which there is no current interest on the part of potential lessees, it is both unnecessary and premature.

At least in so far as the initial round of leasing under a new program is concerned, no purpose would appear to be served by requiring the detailed review of all eligible lands, and significant efficiency would be achieved if the total number of land areas to be so reviewed could be reduced.

2. Allowance for Industry Input.

At the same time, we note that individual companies and entrepreneurs have been anticipating resumed federal leasing since the 1970-71 moratorium on programmatic federal coal leasing. In the interim, potential lessees have had the opportunity to review and evaluate both federal and non-federal coal lands, and have in many instances established internal preferences and priorities for the development thereof.

This process of preparation and anticipation of resumed coal leasing received concrete expression in 1976, when significant areas of unleased federal land were nominated for inclusion in lease sales to be conducted under the EMARS II program.

It would appear to make no sense for the Department to plan for and conduct lease offerings based exclusively or primarily upon its assessment of the relative desirability of federal coal lands independent of or inconsistent with concrete expressions of interest by those entities who will in fact be developing them.

We respectfully suggest that the Department now possesses a data base which could be used as the starting point for its review and analysis of lands to be subject to the first round of lease sales. The initial selection at this time of lands for which there is known, demonstrated interest in resumed leasing would maximize the resources available to the Department to implement leasing in timely fashion, without sacrifice of other public policy considerations.

It should be noted that we do not in this regard propose the adoption of the EMARS II prgram as it has been described in the DES. As so described, this would on a programmatic basis rely exclusively upon industry interests and recommendations to establish potential lease tracts. While this result would not appear to be inconsistent with the provision in Section 2 of the FCLAA that the Secretary may offer lands for leasing "upon the

request of any qualified applicant or on his own motion," (emphasis supplied) we recognize the long range desirability of a Program whereby the Department would review, analyze and offer for lease areas as to which no prior specific indication of lessee interest may have occurred. This would insure that in those instances where the Department's knowledge and evaluation of federal coal lands is superior to that of the private sector, the availability of such lands will be brought to the attention of potential lessees.

Similarly, we do not suggest that a concrete expression of interest in a particular area might in any way reduce or ameliorate the degree of review and analysis which the Department might appropriately conduct before a specific area is subdivided and some or all of the resulting tracts offered for lease. While, as noted in more detail below, we feel that the degree, complexity and redundancy of the various successive stages of environmental review contained in the proposed Program are excessive, we do not suggest that by providing for expressions of industry interest in the very early stages of the land use planning process any appropriate subsequent review steps might be curtailed or bypassed.

-RECOMMENDATION-

It should be expressly provided in the new Program that those areas previously nominated under EMARS II, and those areas with respect to which specific indications of interest have been or may be received by the Department, shall automatically and on a priority basis be advanced through the land use planning process and subjected to review under the activity planning process.

Moreover, we suggest that on a continuing basis the orderly development of the nation's coal resources would be best served by providing in all instances that the coal industry and all interested persons be afforded an opportunity to focus the attention of the Department upon particular land areas for consideration for division into tracts and offering for lease.

3 - Specific Defects of the Process Itself

The DES states that under the preferred alternative,

> "The principle coal resource decision in the land use plan would be the determination of which areas are acceptable for further consideration for coal leasing."

In fact, however, the process described as the preferred Program consists of screening all federal lands through a series of successive reviews the sole purpose of each of which is to preclude, on various grounds, any further consideration of the lands involved for federal coal development.

The process itself, and the sequence of the decisions in the Program, systematically gives precedence to all other articulated environmental, social and natural resource development policies. Land management decisions would be required to be made in the absence of adequate information concerning the nature or desirability of federal coal resources. Indeed, the recognition of the relative importance of such resources in comparison with other competing environmental or social values is specifically precluded throughout this stage of the planning process.

However, both industry and the Department might have a specific need for the coal involved in any given area: industry might require a lease to complete or obtain access to an otherwise undevelopable logical mining unit of federal or non-federal coal, while the Department might determine that coal from a given area is required to fulfill one of its "production targets" (see discussion, below). In either such case, throughout this process of elimination, there would be no opportunity to identify such specific needs.

(a) Exclusionary Determinations

The sequence of the determinations of unacceptability for surface coal mining as set forth in the Program are:

- o elimination of areas not previously identified as having "high to medium" coal potential;
- o elimination of areas based on applicability of the "lands unsuitable" criteria;
- o elimination of areas based on "multiple use values identified and analyzed during conflict resolution;
- o elimination of areas "where surface owners indicate definite preferences against...leasing". (Ibid)

Each step will be discussed in detail.

(i) Coal Potential

First, the Program would exclude from further consideration any areas not previously classified as having "high" or "medium" coal development potential. This fails to recognize that in specific cases coal located in areas not so classified might in fact be desirable or necessary for development in order to expedite or stimulate coal reserves on adjacent non-federal properties. It also fails to recognize that the process of discovery and evaluation of federal coal resources is ongoing and incomplete. Previous classifications by federal authorities are commonly considered to be inadequate. They may not in fact accurately depict the presence, quality or quantity of coal on federal lands. The automatic elimination of all except high and medium potential coal resource areas is, therefore, arbitrary and could prevent the orderly development of specific coal necessary or desirable to a specific potential lessee.

We strongly suggest that the determinative question should be not whether a prior decision by the government has determined that a given coal resource is capable of development. The Program should also provide for recognition of the existence of a potential lessee who, because of contract or other specific and individual circumstances, needs and would expeditiously develop such coal.

-RECOMMENDATION-

> The land manager should be required to consider for leasing specific areas of federal coal which have been brought to the attention of the Department by interested potential lessees whether or not located within high or medium coal potential areas.

(ii) Criteria for Designating Lands Unsuitable for Mining.

The second stage in the land use planning process involves application to those previously determined areas of coal development potential of the so-called "criteria" for designating lands unsuitable for mining.

(A) Procedural Confusion - Application of Criteria

Specific provisions whereby the criteria would be applied are vague and poorly drafted. As a result, it would appear that neither the land managers, the public, nor the industry would have any meaningful opportunity to understand in advance how and to what areas they might be applied.

This process is purportedly set forth in Instruction Memorandum No. 79-76, dated November 8, 1978, published at 43 F.R. 57662 et seq. (December 8, 1978). As so described, however, it envisions no final administrative action at this stage of the land use planning process. There would thus be no meaningful opportunity for industry to anticipate before the fact, or challenge thereafter, the validity of the land manager's interpretation and application of the criteria involved.

In addition to the Instruction Memorandum, the Department published for public comment in the same Federal Register Notice, a document purporting to set forth a mechanism for "Division of Functions and Responsibilities" among Departmental bureaus and agencies with authorities under the various applicable statutues and the President's Environmental Message of May 1977. This is set forth as Appendix B, at 43 F.R. 57666.

Each of these elements of the Program is seriously defective.

Instruction Memorandum No. 79-6, informs State Directors that the final product of the review process set forth therein will be a "printed and reproducible MFP supplement." The Memorandum, however, is unclear as to how and under what interpretation application of the criteria or possible exceptions might occur.

For example, in "Step 3" the Memorandum has directed BLM State Directors to apply the criteria, without exceptions, and authorizes the application of broad presumptions and anticipatory conclusions in advance of actual data. No similar presumptions are provided for in "Step 6", in which exceptions are to be "applied" to the criteria. Virtually all of the exceptions require application of precisely the same qualitative and quantitative judgments as the criteria themselves. As a result, the effect of allowing the application of presumptions and the anticipation of non-existent data only in "Step 3" is therefore to preclude any meaningful availability of exceptions at the time of implementation of "Step 6".

Steps "9" through "11" provide guidance as to how the final product should be drafted, but also do not appear to authorize the application of these exceptions. In Step 10, the officer is directed to prepare "a statement for the areas on which the criteria would exclude mining based on the Department's unsuitability criteria only" (emphasis in original). In Step 11, he must "make a decision on which areas would be excluded from mining by the criteria and multiple use trade-offs. The remaining areas are acceptable for further consideration for coal development."

While the memo notes under "Format and Documentation Requirements", Section "2", at 43 F.R. 57666, that the "Updated Plan" should be a "reproducible supplement" that should include "stipulations and conditions...developed during the application of the criteria and exceptions," no specific reference to the method of approval or formal designation of those lands to be deemed unsuitable indicates the status, or the manner of review, of recommendations for exceptions.

Finally, the memo directs under "Record of How the Unsuitable Area Was Developed", ibid, Section "4.c." that a map be printed "showing all exceptions identified in Step 6 and a narrative indicating the terms or stipulations required".

Nowhere, however, is it indicated what the ultimate effect of the determination made in Step 6 might be.

The "Division of Functions" is similarly unclear and confusing.

As a theoretical proposition, centralizing and coordinating unsuitability determinations would have positive advantages. Operators and the public would benefit from a thorough review of federal lands at an early stage of planning, so that mine plans and operations may thereafter be undertaken with greater assurance. Similarly, land managers would benefit from an orderly and early determination of areas which may or may not be used for mineral development. Such early determinations would help to ensure that an orderly leasing program may be meshed with national energy policy, and lands freed for other uses.

As a final general observation it is obvious that clearer lines of authority and responsibility are needed in this proposed program. Appendix B purports to represent such a "division of functions and responsibilities", but in fact this scheme creates a virtually unworkable interagency committee system for receiving, reviewing and acting upon all unsuitability matters.

The functions which would purportedly be delineated, include "Determining the mineral characteristics and values of the land proposed for leasing..." Section A.1.a.

Subsection "A.2." relates to the decision process following a petition by interested persons for designation of federal coal lands as unsuitable for surface coal mining. Alternative 4 is adopted, whereby it is recognized that the Office of Surface Mining (OSM) has the responsibility for "issuing decisions", and a mechanism created whereby OSM has this responsibility subject to administrative review based on non-concurrence by a surface managing agency.

There is, however, no statutory authority for such petitions, and they would have a devastating effect on the Program and national energy policy.

Only one of the many stututory authorities cited to support the proposed unsuitability criteria provides for such petitions: SMCRA. Under Subsection 522(b) of that Act it is the Secretary and the Secretary alone who is charged with reviewing and designating federal lands as unsuitable for all or certain types of surface coal mining. Unlike Subsection 522(c), which applies to non-federal lands, this subsection authorizes no petition process for designation of federal lands as unsuitable. To introduce such a procedure would eliminate entirely the effect of the secretarial review and designation process, and leave both operators and land managers in a continuing state of uncertainty as to the permissible use of federal lands.

Even if such authority did exist, moreover, the result set forth in Subsection "A.2." would be inconsistent with the result set forth in Subsection "A.3.", in which with respect to the federal coal lands review required by Subsection 522(b) of SMCRA, BLM is to apply criteria resulting in the determination of suitability for surface mining of coal. This latter decision, assigning responsibility to BLM, is itself consistent with the decision under Subsection "A.4.", whereby BLM is delegated similar responsibility for such determinations with respect to non-coal mining, and with subsequent decisions relating to preparation of EIS's (Subsection "A.5."), preparation of lease terms and conditions (Subsection "A.6."), Secretarial representation in dealing with lease applicants (Subsection "A.7."), and consultations with qualified private surface owners (Subsection "A.8.").

The memorandum is similarly confusing in Subsection "B.", dealing with "post leasing pre-mining functions".

In this Subsection, OSM and the U.S. Geological Survey ("USGS") are jointly delegated the function of determining whether a proposed use of federal surface over leased federal coal, "unrelated to rights granted" under the coal lease, is allowed.

This is inconsistent with the responsibility assumed by the state directors of BLM under Instruction Memorandum No. 79-76. It is therein provided that during the multiple resource trade-off process, questions of resource use inconsistent with federal coal development (including, of course, inconsistent surface uses) are to be reviewed and decided by that officer. If, as is now proposed, the development of any federal coal lease remains subject to later determination pursuant to this subsection that a preferable (i.e.higher) use might be allowed, then the prior determination by the BLM and the coal lease itself becomes meaningless.

We suggest that rather than assigning clear responsibility, Appendix B appears instead to represent an institutional inability to separate lines of authority. No agency would appear to have lead responsibility at all, for any phase of the review process. OSM would apparently provide the mechanical function of receiving petitions and arranging hearings, but would not have responsibility for substantive input or critical review. Any number of "surface management agencies" will provide this substantive review function over an unlimited time period, and submit recommendations. Then, once the petitioning, review, input, and hearing process is completed, objection by OSM to the findings only results in the entire decision being bucked up to "headquarters". (43. F.R. 57666, section A.2.c.4.)

We can agree with the Department's interest in tapping all appropriate interagency sources of information during the review phase. However, as proposed, this system will not produce a smooth flow of factual inputs leading to a well-reasoned decision. Instead, the system is rife with potential for delays, conflicting inputs and recommendations, and would be likely to frustrate the Department's stated intent to expedite land use decisions.

The uncertainty and procedural irregularities of the entire land use planning process, as described in the DES and the above supplementary materials, is heightened by the language appearing at DES 3-20, as follows:

> After completion of the land use plan, the Department could exclude additional lands from further consideration for leasing when warranted by new information without formally revising the plan.

There is no indicated mechanism or safeguards whereby this might be accomplished. It would appear to be the assertion of an intention to allow ad hoc, undisclosed actions by the officers involved which would have the precisely similar effect to formal designation of lands unsuitable for mining.

No such authority should exist, or may exist consistent with the operative provisions of the relevant statutory authorities requiring public participation in the land use planning process or the Secretary's stated intentions to implement the Program only with adequate public participation.

-RECOMMENDATION-

> We recommend that the procedural aspects of the unsuitability criteria application mechanism be substantially clarified. It should be clearly delineated from management activity which would determine multiple resource use trade-offs, and specific departmental responsibilities assigned.

Finally, the directions contained in Memorandum 79-6 provide for defacto application of an exclusionary criterion which the Department has publicly maintained was deleted from this mechanism.

Step 8 of the Memorandum requires the determination that an area is unsuitable if the BLM officer receives "negative comments from the surface land owner." There is no indication of the intended meaning of the term "surface land owner" in this context, but application of a determination such as is required by this step was included as a specific criterion in previous drafts reviewed by the Department. See, Final Report, Coal Task Force 2, Land Unsuitability Criteria, September 11, 1978, at 61.

Because of the unacceptably adverse results obtained during field testing of these earlier draft criteria, this specific element was eliminated. Now, however, compliance with Step 8 would effectively create an absolute surface owner veto over federal coal mining.

Moreover, since surface owner consent is no longer set forth as a specific criterion, no exception mechanism whatever would be available for relief from the application of this determination.

The DES notes in significant detail at 5-134 et seq. the unacceptable adverse consequences that application of this criterion would have caused to the development of federal coal under surface estates in private ownership. We strongly suggest that no consideration of surface ownership patterns should be given by the land manager until the time of actual lease tract selection and offering, so as to encourage negotiation with surface owners as planning continues.

-RECOMMENDATION-

We recommend that the procedural aspects of the unsuitability criteria application mechanism be substantially clarified. It should be clearly delineated from management activity which would determine multiple resource use trade-offs, and all reference to extraneous and informal criteria such as surface owner "preference" should be deleted entirely from this stage of the planning process.

Provision for petitions to designate federal lands unsuitable for mining should be deleted from the Program.

(E) Procedural Confusion - Exception Mechanism

Moreover, the thrust and ultimate scope of the criteria themselves is completely confused by virtue of the uncertainty as to when, how and by the application of whose discretion the "exceptions" to the application of such criteria might be implemented. As now drafted, the exceptions would in many cases appear to contradict the criteria themselves. In other cases, the necessary finding that would enable the exception to be applied is itself so broadly stated that it would be virtually impossible to implement (e.g., "it is impractical to exclude such area"; "will not adversely affect"; "potential for harm...can be minimized"; "is not necessary to protect"; and "no significant adverse impact").

Literal application of the above quoted language would, in effect, require the proof of a negative: the demonstration of the absence of the stated adverse impacts. A conclusive determination to support or deny an exception would be impossible or, at the very least, subject to immediate legal challenge.

Further, as presently drafted the exception process will likely result in no relief being granted from proposed designations. This is so because at the point in time when an unsuitability determination is under review--long before tracts are nominated for leasing--no party is likely to be able to undertake the effort and expense of demonstrating that an exception is warranted. In fact, it may well be impossible to make such a showing at that time.

Reference to the exception from the Migratory Bird criteria is enlightening in this regard. Under the proposed "exception," leasing may be allowed:

> Where the land management agency, after consultation with the Fish and Wildlife Service, determines that coal mining will not adversely impact the migratory bird habitat during periods when such habitat is used by the species.

Assuming that neither the land management agency nor the Fish and Wildlife Service will be inclined to make the required showing sua sponte, this task must devolve upon parties interested in long term leasing of the area. This would prove to be impossible under the Program.

In the first place, temporal limitations such as "during periods when such habitat is used" are meaningless in the content of an ongoing mining operation. It simply cannot seriously be argued

that a major mine should, or could, cease operations while even the rarest of birds fly by. Even if this were not the case, however, effective review of the availability of an exception would require significant knowledge of the extent of coal resources in the subject area. However, under the Program proposed exceptions would be ruled upon before the Department conducts the coal resource review required by FELAA or Section 522(d) of the SMCRA.

An interested party would thus be required either to seek an exception without knowing the extent, if any, of recoverable resources involved, or face the prospects of conducting an exploration program for the area in question. Even then, however, depending upon the size, shape and location of the area proposed for designation, its value in relation to a logical mining unit will still not be known until the overall area to be leased is identified.

In short, there is virtually no way that the interests of mineral development can be fairly represented under operation of the exception now proposed. It would operate to preclude a full and timely presentation of the data necessary to support such a ruling.

-RECOMMENDATION-

> The process of defining and applying exceptions to otherwise applicable criteria should be clarified, so that the resulting product will allow all areas which are or could be determined to be subject to exceptions remain available for further consideration in the planning process.

(B) Substantive Defects of Criteria

General Comments

Detailed comments with regard to several of the 24 individual proposed unsuitability criteria are provided below. The DES states these criteria to be based upon various "authorities," ranging from statutory mandates such as those found in SMCRA and the Endangered Species Act of 1973, P.L. 93-205, 16 U.S.C. 1531 et seq., as amended, to such less definite references as unidentified "departmental policies" and "proposed legislation."

From a substantive standpoint, the specific criteria appear uniformly to far exceed the letter or intent of the statutory provisions that direct that federal lands be reviewed and, where appropriate, designated to be unsuitable for coal surface mining.

More specifically, the Congressional direction on designating lands unsuitable for mining is contained in the Surface Mining Control and Reclamation Act of 1977, P.L. 95-87, 30 U.S.C. 1201 et seq., (SMCRA). Subsection 522(b) of this Act, 30 U.S.C. 1272(b), directs the Secretary to review federal lands pursuant to the standards set forth in Subsections 522(a)(2) and (3). Subsection 522(a)(2) directs the designation of areas unsuitable for surface coal mining if "reclamation pursuant to the requirements of this Act is not technologically and economically feasible." Subsection 522(a)(3) directs such designation where mining would be incompatible with existing non-federal land use plans, or would "affect fragile or historic lands...", affect "renewable resource lands..." or affect "natural hazard lands..." with certain proscribed results.

The operative terms "fragile or historic lands," "natural hazard lands," and "renewable resource lands" are central to an appropriate determination of the intended Congressional scope of the authority to designate lands unsuitable for mining. In effect, these terms define those types of lands which are intended to be subject to protection pursuant to this federal land management mechanism. The Congressional direction is thus addressed to the character of land areas and the physical conditions and effects which coal surface mining operations might produce. (See discussion above, and see, especially, comments re "federal lands review" of "classes of lands unsuitable" versus a program to govern operations, in BLM Statement of Policy, 43 F.R. 57662 at 63, December 8, 1978.)

By contrast, many of the criteria set forth in the preferred Program do not address such physical conditions or effects. They relate instead to a wide range of different, secondary effects. They would seek the achievement of environmental or social goals, and the prevention of undesired impacts upon other values not related to the land itself.

As a result, we seriously question whether the criteria as now proposed do not at least exceed and, in many respects, contravene the federal policy set by the Congress. This would apply particularly to those criteria which are not related directly to the condition of the land involved, and are not mandated by statute.

With respect to Subsection 522(a)(3), SMCRA does not, itself, define the terms used to set forth the scope of the program for designating lands unsuitable for coal mining. The Congressional intent with respect to those terms is, however, clearly evidenced by related previous legislation to achieve the result intended by Section 522. The specific language of SMCRA above derives from, and is a direct quotation from, legislation introduced in the 93rd Congress in 1973 as S. 168. This so-called "land use legislation" specifically defined the operative language later adopted by the Congress in Section 522 of SMCRA, in terms significantly more narrow than would justify or support the criteria now proposed by the Department.

Thus, "fragile or historic lands" were defined as those where uncontrolled or incompatible development "could result in irreversible damage to important historic, cultural, scientific, or aesthetic values or natural systems which are of more than local significance."

"Natural hazard lands" were defined as those where such development "could unreasonably endanger life or property...".

"Renewable resource lands" were defined as those where such development "which results in the loss or reduction of continued long-range productivity could endanger future water, food, and fiber requirements of more than local concern...".

As applied to determine the scope of Section 522, such definitions indicate a Congressional intent to create a degree of protection and control over land areas which is much more narrow in scope than this element of the preferred Program.

We support in principle the concept that irreconcilable conflict with specific, unique and higher resource values will render some land areas unsuitable for surface mining. We believe, however, that the intent of the Congress and sound public policy is best served if the application of this mechanism at the pre-lease stage is limited to those circumstances in which the Department finds that a specific land area could not, under any foreseeable circumstances, be surface mined without significant and irreversible or irreparable damage, to unique or irreplacable values or resources, not otherwise subject to specific statutorily created control mechanisms.

Under the Program now proposed, the issuance of a coal lease does not in and of itself create any right of development.

In all cases of doubt or where reasonably foreseeable changes in technology could enable development to occur, the lease should be able to be granted.

-RECOMMENDATION-

Final or formal determination that a land area should not be subject to even the possibility of the later issuance of a lease should be limited in application to those circumstances where no possibility of development consistent with other national policy is possible.

Moreover, our concern on this general point is not based merely upon the absence of a valid reason to support the lands unsuitable mechanism as now proposed. We strongly suggest that other, compelling reasons of public policy would proscribe its adoption, and be contravened by its implementation. Those criteria which involve protection by this administrative mechanism which would be redundant of other mechanisms implemented by other federal agencies, and which are not expressly mandated by federal law, are by definition inflationary. The creation, maintenance and implementation of this additional Federal regulatory step is in such cases unnecessary to achieve protection of the values involved. Its discretionary inclusion in the Program is without justification from an economic or policy standpoint.

-RECOMMENDATION-

Those criteria within the jurisdictional responsibilities of federal agencies or bureaus other than BLM should be implemented under the program by those agencies.

All specific criteria are treated in the DES and Instruction Memorandum 79-76 as if incorporated under the unsuitability designation program of Section 522 of the Surface Mining Act. This is not, however, the case.

In those few instances in which specific Congressional authority other than SMCRA is cited as support for a proposed criteria, the legislation, as cited, in fact discloses the criteria to far exceed the purpose and intent of the statute itself.

For example, as drafted the proposed migratory birds unsuitability criteria, number "14" at 43 F.R. 57669, DES at 3-10, would rule out mineral leasing as a surface land use when such federal lands are "high priority habitat for migrating bird species of high federal interest on a regional or national basis." The statutory authority cited for this criteria is the Migratory Bird Treaty Act of 1918 (16 U.S.C.A. §703 et seq.). This Act, however, merely prohibits the actual or attempted pursuit, hunting, taking, capture, or killing of certain migratory birds protected by international treaty agreements. However, rather than a restriction against the hunting of these migratory fowl, the proposed criterion, by contrast, extends to the habitat of such fowl, and presumably will include any place in the transcontinental migratory zones or flyways. We submit that this is a much broader level of protection, of a much different kind, than may be supported by the 1918 Act. Moreover, the exact scope of this provision is left unclear through use of such indefinite terms as "high priority habitat" and "high interest." The resulting criterion is thus subject to widely varying interpretations, and, thus, to potential abuse.

With respect to the specific criteria, we note the following:

1. Federal Land Systems. By statute, certain federal lands cannot be used for mineral development purposes. In addition to lands subject to particular legislative classification, SMCRA sets forth several major subcategories.

   However, criterion number "1" overstates this protection in several ways.

   First, even SMCRA acknowledged that valid existing rights to minerals on these lands should be recognized. Second, rather than being limited to the Custer National Forest, waivers of the basic prohibition are allowed under SMCRA for any national forests, with concurrence of the Secretary of Agriculture. Finally, no authority or administrative record would appear to exist to support extension of the criteria to "appropriate buffer zones" around these lands, or for extending this protection to lands which have merely been recommended for inclusion in the stated categories.

2. Right-of-Way and Easements. There appears to be no need for such a restriction. Federal lands which are in fact part of legally recognized and recorded easements on surface leases commonly have existing written restrictions regarding access to the mineral estate. In the absence of any such restrictions, departmental policy statements should not be allowed to alter the effect of applicable law upon any contested property rights involved.

3. Buffer Zones Along Rights of Way and Adjacent to Communities and Buildings. This category is expressly referenced in SMCRA. However, for purposes of accuracy, the reference to "highway" should be changed to "road", and the statutory recognition of valid existing rights to such areas noted.

4. Wilderness Study Areas. Although there is statutory authority for withholding areas actually designated as wilderness study areas from leasing, there is no basis for imposing a wilderness inventory criteria. Furthermore, as drafted this provision would appear to require the interpretation that an existing EIS may be invalid unless it has analyzed whether an area possesses the characteristics of a wilderness study area. Whatever other changes may be contemplated for this criterion, the EIS requirement should clearly be made prospective only.

5. Scenic Areas. Although visual resource analysis may be a valid consideration when reviewing other of the proposed criteria for designations, to introduce esthetic quantification as an independent basis for such designation is insupportable. Not only is the stated statutory source for this provision of highly questionable validity, the practical difficulties of application of such a nebulous criterion are insurmountable. Retention of this provision can only lead to endless debate and delay in the leasing program.

6. Lands Used for Scientific Studies. As in the case of the proposed right-of-way provision, this proposal appears to be surplusage. If federal lands have been permitted by the management agency for scientific purposes, then the written instrument which conveyed that permission creates rights and would govern the restrictions--if any-- on alternative surface uses. The exception contained in (6), if capable of implementation, would represent a fair approach to dealing with this narrow issue without creating an additional basis for unsuitability.

7. Historic Lands and Sites. Although all of the cited statutory sources provide for the preservation and protection of areas of historic or archeological values, only Section 522 of SMCRA precludes the mining of such areas. This restriction, however, extends only to those areas included in the National Register of Historic Sites, and is even then tempered by recognition of valid existing rights to the mineral development of such areas. The proposed criterion appears to have disregarded the provisions and limitations of SMCRA and significantly and improperly broadens the scope of this provision to include areas eligible for historic protection, as well as buffer zones around the outside boundaries of such areas. We seriously question the wisdom, propriety or effect of authorizing such determinations to be made by the land manager of the BLM in the land use planning process.

8. Natural Areas. The obvious questions raised by this provision are (1) What are "natural areas?" and (2) By what authority are they singled out for special departmental protection? The only source of illumination as to these inquiries are "departmental

policy" -- unidentified -- and proposed legislation. The department's desires and intentions are no substitute for Congressional directives, particularly when the long-term use of federal lands is at issue.

Moreover, if any implication of Congressional direction is to be inferred from proposed legislation which has not been enacted, it would be that Congress did not intend the result expressed in the legislation. Until there is direction from Congress, this basis for unsuitability rulings is premature and should be deleted.

9. Federally Listed Endangered Species. As previously noted, unlike the vast majority of these proposals, the statutory authority for this criterion is quite clear. There does exist a clear statutory mandate--bolstered by interpretative court decisions that various specifically enumerated species of plants and animals shall be protected from adverse federal agency action. The destruction or adverse modification of a critical habitat is also prohibited. However, the scope of the ban on mining as a surface land use contemplated here is arbitrary. As a result of developing technology for mitigating the impact of mining on wildlife habitat, surface mining reclamation efforts can actually enhance habitat and, as a result, mining can be a preferable land use from this point of view when compared to other surface uses.

10. State Listed Endangered Species. It is particularly inappropriate for federal land managers to attempt to implement such narrow and perhaps scientifically unsupportable methods of land policy as state endangered species legislation. Such questions are particularly subject to local interests and pressures, and inappropriate as determinants of federal policy. For example, it is not uncommon to find a particular species protected by one state while in a neighboring state the same species is subject to open hunting rules. As previously noted, the import of mining a habitat may well prove to be beneficial as a result of reclamation techniques. A preferred approach to species protection, would be on the basis of the surface user's ability to protect and enhance the subject wildlife habitat. Such an approach, however, should be accomplished as a part of the permitting process and not, as contemplated by the proposed Program, long before tracts are considered for leasing.

11. Bald and Golden Eagle Nests. As with the research being done on habitat enhancement generally, this prohibition would appear to ignore the extensive research into and practical application of nest manipulation techniques. Such techniques are widely and commonly used for relocating osprey nests and, to a less extent, for bald eagles as well. Testing is continuing for similar treatment of golden eagle nests. In view of these developments, the flat prohibition of mining within a quarter mile radius of any such nests is an unreasonably over-broad restriction. Again, as with most of the exceptions noted, although leasing may be allowed if a nest relocation permit is obtained, it is highly unlikely that any operator will be prepared to make the necessary technical showings for such a permit well in advance in lease tract selection. Therefore, as with other proposed criteria, the sort of inquiry appropriate to valid land use decisions should be made closer in time to actual mining as part of a mine plan or permit application.

12. Bald and Golden Eagle Roost and Concentration Areas. The terms "roost" and "concentration areas" are terms of art which, if applied correctly, should not exclude unnecessarily broad areas from leasing consideration.

13. Falcon Cliff Nesting Sites. In view of the existing statutory protection afforded those species of falcons considered to be endangered -- i.e.: the Perigrine falcon -- it seems unnecessary to carve out an additional protective provision here. Further, as for the many species of falcons which exist in abundant numbers, there is no basis for such special treatment. We do note that language from preliminary draft regulations referring to "raptor" nesting sites has been deleted. This is a particularly appropriate change because of the exceedingly broad category of birds which would be encompassed by this classification, which extends to all species which grasp their food raptorially, i.e., all owls, hawks and vultures.

14. Migratory Birds. As previously noted in the introductory comments, there is no legal nexus between this proposed criterion and the basic purpose of the underlying statutory authority. Moreover, the legislation involved here specifically protects birds and not habitat as proposed herein. If habitat protection is in fact the intent of the draftsmen, we have previously

indicated that coal mining reclamation technology is demonstrating a positive rather than a negative value with regard to habitat preservation. This criterion, however, focuses solely upon protection of habitat, and does so by erecting an absolute ban on mineral development over the vast surface areas which can and do provide habitat to the migrating fowl which traverse the continental United States. The extent of land which this flyway habitat protection would encompass is neither identified nor identifiable and yet a non-use criterion is based upon it.

15. State Resident Fish and Wildlife. As noted regarding the suggested state endangered species criterion, inclusion of these types of considerations in federal land use decisions is inappropriate. To try to accommodate the various and varying state decisions in this area introduces an arbitrariness into the federal planning process which is unnecessary and unneeded. If there are legitimately protectible species or habitats, then they will have been identified independently and isolated for special treatment, and thus, this separate criterion shall be unnecessary.

16./17. Wetlands/Floodplains. These two criteria, taken together, reveal a further departure of departmental interpretation from underlying executive order intent. In the first place it must be recognized that the cited authority for these criteria are Executive Orders which interpret authority granted under the instructions of NEPA. However, by incorporating these interpretations into agency policy-prohibitions with regard to land use decisions, the thrust and balance of NEPA has been lost. Again, the mitigating influence of the exceptions provisions are so ill-timed that no relief from the basic prohibitions is allowed.

18./19. Municipal Watersheds/National Resource Waters. While it is difficult to argue with the legitimate need to protect watersheds used for human consumption, or of their importance as a "national resource" it appears that these criteria are much broader in scope. Because of the absence of clear definition of protective intent, these criteria stand to be unnecessarily burdensome impediments to any land use planning decisions. It would seem more appropriate to address resource issues such as these on a more individualized basis rather than as a prohibition of national application.

20. State Lands Unsuitable. This proposal further extends the unwarranted use of buffer zones to broaden the application of land use restrictions. To the extent that such federal land protections are needed at all they can be provided on a site specific basis and the process for automically excluding federal lands from development eliminated.

21. State Proposed Criteria. This proposal has absolutely no authority in law. States' inputs as to the potential use of federal lands are valuable decision-making items, but cannot have any compelling value in terms of federal action. Only the Congress can affirmatively act to direct the use of lands in the public domain.

22./23./24. Prime Farm Lands/Alluvial Valley Floors/Reclaimability. Each of these three areas are clearly and explicitly covered by the Surface Mining Act, and no other existing statutory authority is applicable to these topics as federal lands. According to that Act there is no prohibition on mineral development surface use merely by virtue of these classifications, and the legislative history behind this Act makes clear that no restriction or ban on mining was intended. Indeed, the thrust of the recent surface mining legislation was to provide for special, protective permitting and operating procedures to take into account these land areas. These three criteria should be deleted as absolutely inconsitent with the sole statutory authority which addresses these issues.

Moreover, SMCRA clearly envisions the delegation of determinations of technological and economic feasibility to the Office of Surface Mining. To require any negative such determination to be made at the prelease stage is not required by SMCRA, and would be seriously premature. As has been demonstrated in recent years, especially since the 1973 Arabian OPEC oil embargo and resulting increased unit costs of energy, conditions of mining technology and market conditions determine the viability of development of a lease in this context. Changes in each such condition can occur rapidly. The only meaningful time at which such a determination can and should be made is at the time of mine plan submission and approval. This is fully consistent with Section 522(b) of SMCRA, and would constitute a determination whether or how to "condition...mineral entries."

-RECOMMENDATION-

The specific criteria should be redrawn as submitted.

As an alternative to the above recommendations, we have the following specific suggestion. Under all relevant constructions of the need for a mechanism to determine lands unsuitable for mining, the desired result is only that such lands not in fact be leased. Although the early and clear application of specific criteria would lend a desirable degree of certainty to the balance of the land use planning process and to the review by industry of possible areas for federal leasing, the principle element of unworkability contained in the proposed program is the lack of a clear process and an assured opportunity to question or challenge the decisions of the manager during this stage of the process.

The adverse consequences of the program as now described would be greatly reduced if the formal effect of the initial application of whatever criteria might ultimately be adopted were otherwise then as now described.

-RECOMMENDATIONS-

The effect of application of a criterion for designating lands unsuitable for mining should, in the absence of statutory mandates to the contrary under SMCRA, be limited to creation of only a rebuttable presumption against leasing.

(iii) Multiple Resource Use Trade-Offs

Elimination based on most multiple use values is expressly stated as an adjustment to be made to accomodate "unique, site specific resource values clearly superior to coal but not included in the unsuitability criteria. A prime recreation site or campground might be an example." (Ibid.)

It would be difficult to imagine or describe a more systematic bias against the development of a single resource, coal. Implementation of the planning process so described simply cannot honestly be characterized as a coal management process. It is precisely the converse: a process whereby all other resources on federal lands will be managed and given priority over coal, even to the extent of determining that the preservation of one of the numerous prime recreation sites on federal lands should control over developing a coal resource.

With respect to this specific example, it might be noted that the multiple resource trade-off decisions will occur independent of and subsequent to the application of the specific criteria for designating lands unsuitable for mining. Those criteria themselves exclude federal land systems traditionally associated with recreational uses. As a result, this stage of the elimination process would apply only to those recreation areas not deemed by the Department or the Congress worthy of inclusion in one or more of the indicated land management systems.

The quality, physical and chemical content of each coal deposit and of each individual segment of a coal seam will vary considerably. As a result, each individual potential consumer of this energy resource will have very specific requirements. As now proposed, however, the Program affords absolutely no mechanism whereby the relative desirability of particular coal seams or deposits may even be determined, much less taken into account in balancing multiple use resource trade-off decisions. There is no requirement whereby the land manager might identify individual coal characteristics, and there is no mechanism whereby any entity in the private sector may even introduce such manifestly important questions into the decisionmaking process.

The DES implicitly defends the policy set forth in the proposed Program by reference to the instruction by the President in his May 24th memorandum to the Secretary to lease "only those areas where mining is environmentally acceptable and compatible with other land uses." (emphasis supplied)

In fact, the test set forth by the President, and now adopted by the Secretary, that any development of a federal lease must be "compatible with other land uses" is a flat and direct violation of the policy set by the Congress in the Mining and Minerals Policy Act of 1970 and the Multiple Use Sustained Yield Act. It is a violation of the policy set forth in NEPA itself, which provides in relevant part:

> "The Congress...declares that it is the continuing policy of the Federal Government...to use all practicable means and measures...to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans....
>
> It is the continuing responsibility of the Federal Government to improve and coordinate Federal...resources to the end that the Nation may...obtain the widest range of beneficial uses of the environment /and/ achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities." Sections 101(a), (b), 42 U.S.C. 4321.

In this regard, the DES as now drafted fails completely to address the adverse environmental, social and economic impacts of the Secretary's policy preference against federal coal leasing and in favor of all other federal resource development. The clear and obvious effect of postponing any consideration of technical coal data until after completion of the land use plan and the completion of the process of elimination from eligibility for leasing of all areas which are not "compatible with other land uses" (DES, at 3-21, 3-20) must be recognized and assessed in any final environmental statement upon a program which produces this result.

Classification of land areas as unsuitable for mining would permanently and for all practical purposes irrevocably eliminate such areas from the then current leasing cycle. If, instead, the effect of such a determination were merely to create a rebuttable presumption against leasing that would be subject to later review during the activity planning process, some of the adverse effects would be reduced. Potential bidders and

environmental interests alike would be put on notice that the possibility exists either that the lands will not ultimately be offered for lease or that, if so offered, specific conditions might be attached thereto. This would have the effect of focusing the attention of both the government and other interested parties upon the lands in question, and ensure that a final determination at the conclusion of all stages of the planning process would be based upon the maximum possible data and information.

Adoption of such a mechanism would, in addition, significantly reduce the administrative and economic burden to the government that is represented by the obligation to review all eligible federal coal lands for the purpose of applying the lands unsuitable criteria. To the degree that the result of such a modified screening process would not result in a permanent classification of the lands involved, the administrative formality and the underlying data base requirements could be significantly reduced. This would increase the possibility of timely completion of the screening process and simultaneously and appropriately place the burden of creating the evidentiary basis for final decision upon the private sector.

Such an approach would, finally, serve to ensure that a final determination of unsuitability occurs as a specific, well defined point in the administrative process. It would enable judicial or other challenges to the final decision to be made with the greatest efficiency, and minimize the possibility of protracted, redundant litigation.

-RECOMMENDATION-

Decisions made during the multiple resource use trade-off phase should create only rebuttable presumptions against leasing. Where no permit or grant of authority exists which would create an enforceable right to an absolutely inconsistent land use, all land areas subject to resource trade-off should be allowed to continue to be reviewed for coal use.

(iv) Exclusion Based on Surface Owner Consent

Finally, the directions contained in Memorandum 79-6 provide for defacto application of an exclusionary criterion which the Department has publicly maintained was deleted from this mechanism.

Step 8 of the Memorandum requires the determination that an area is unsuitable if the BLM officer receives "negative comments from the surface land owner." There is no indication of the intended meaning of the term "surface land owner" in this context, but application of a determination such as is required by this step was included as a specific criterion in previous drafts reviewed by the Department. See, Final Report, Coal Task Force 2, Land Unsuitability Criteria, September 11, 1978, at 61.

The DES notes in significant detail at 5-134 et seq. the adverse results obtained during field testing of these earlier draft criteria and the scope of the impact which this criterion would have had on the development of federal coal under surface estates in private ownership. As a result of these negative findings, this criterion was eliminated. Now, however, compliance with Step 8 would effectively create an absolute surface owner veto over federal coal mining.

Moreover, since surface owner consent is no longer set forth as a specific criterion, no exception mechanism whatever would be available for relief from the application of this determination.

We strongly suggest that no consideration of surface ownership patterns should be given by the land manager until the time of actual lease tract selection and offering, so as to encourage negotiation with surface owners as planning continues.

-RECOMMENDATION-

All reference to extraneous and informal criteria such as surface owner "preference" should be deleted entirely from this stage of the planning process.

B. ACTIVITY PLANNING PROCESS (DES, PAGE 3-4)

As now described, the "activity planning" for each federal resource in the planning area would follow completion of the land use plan itself.

"Regional production targets" would be set for coal. Preliminary tracts would be identified, ranked and scheduled for offering, and regional EISs prepared.

In this process, industry would be invited to submit "expressions of interest" in possible tracts for leasing. After these "preliminary tracts" have been determined, the potential environmental impacts related to each tract would be reviewed.

The sole discussion of the possible adverse consequences on land use management trade-off decisions appears as follows:

> "This component...is incompatible with the industry indications of need alternative which relies on industry nominations to resolve the question of leasing levels. Similarly it is incompatible with the lease to meet DOE production goals and the state determination of leasing levels alternatives which rely on DOE and the states, respectively, to set the levels of development." (DES, at 3-23, 24.)

In fact, however, each element of the Program causes difficulties.

(1) Regional Production Targets

Coal bearing areas of the country have been divided into twelve production regions, eight of which contain significant federal coal reserves. Under the Program, each such region will be "managed largely as a separate coal production unit."

National coal production targets would be set annually by the Department of Energy, pursuant to the DOE Act, and subject to modification by the DOI. The number of tracts selected for offering, the amount of coal to be leased and the proposed timing of their sale would be determined by reference to the production "target" established for the region involved by the Department.

The entire activity planning process is, thus, controlled by and a direct function of the setting of "production targets" that will be set and used by the Department to decide how much coal should be made available in any given lease offering.

Both the manner of intended application of regional production targets and the timing of their use presents serious difficulties.

(a) Use of Targets

We seriously question the utility of regional production targets as determinants of the levels of future coal leasing.

Under the Department of Energy Authorization Act, the DOE is directed to develop proposed national energy production goals for federal lands, based upon production estimates provided by the DOI or developed by DOE, as adjusted for changes in applicable laws and regulations, technology or recovery methods.

The proposed Program would convert these goals, as further modified by the Secretary, into specific production quantities from which estimates of future coal leasing and production requirements will be derived.

In fact, however, the impression of accuracy and reliability conveyed by the DES description of the regional production target setting process is seriously misleading. Coal market forces are subject to significant fluctuations over relatively brief periods of time. Long term trends are difficult to predict with accuracy. Even relatively recent data regarding potential production from existing federal leases for which mine plans have been submitted or are known to be in preparation is now of uncertain reliability.

The market condition in the coal industry is, for instance, depressed at this time. Some mines have been closed, and the opening of others significantly delayed due to the absence of assured markets for future production. Data collected as recently as last year by the National Coal Association in many respects no longer accurately reflects the future contributions of major production activity previously planned.

Estimates of production from other federal leases for which mine plans have not been prepared are even more speculative. Demand-based modelling such as is presently used within both the government and the private sector is of particularly questionable reliability, due to the magnitude of the effects thereon of such variables as supplies from foreign energy sources, future contributions of competing domestic energy resources, and the past and future effects of major changes in the governmental controls on the development, production, transportation and consumption of coal.

The number and relative significance of the variables involved prevents any single decisionmaking entity from being able to assess future levels of production and use with the specificity that would be required for successful implementation of the Program. In the past this has been especially true with respect to the efforts of the federal government to model the private sector of the economy. Serious problems have already been identified with the models currently in use, and the reliability of estimates which would disaggregate supply and demand and seek to assign regional values would be even more difficult.

The nature of the coal industry, the nature of its markets and the extraordinary variabilities to which it is subject produces a demand-supply situation of such complexity that even the most sophisticated modeling techniques cannot approximate future realities.

The consequences of the DOI reaching too high a regional production target would merely be that too many leases might be offered or issued. As noted above, existing regulatory requirements would prevent any actual adverse effects of such a result, and competition would be enhanced.

The Program, however, contemplates only reduction of targets below DOE recommended levels, and the Secretary rejected all options that would tend toward higher target ranges. (DES, at 3-30, 31.)

Moreover, as now described, in the event that the federal leasing target applicable to a particular region exceeds the producable coal in "the more highly ranked Federal tracts, the regional production targets itself could be re-evaluated and modified." (DES, at 3-4.)

The consequences of error on the low side in reaching target levels would be significantly worse from a departmental, economic and energy standpoint. Serious disruptions of all planning would occur in corrective efforts. Anticompetitive and inflationary market pressures would be created, and energy goal achievement jeopardized.

Neither of these facts or consequences are adequately discussed in the DES.

Where settled national policy establishes the clear need for enhanced utilization of domestic energy resources to fulfill the nation's future needs, such future demand estimates as would be represented by the regional production targets in the Program should not operate as the actual determinate of specific levels of resumed federal coal leasing. Reliance upon such targets for such purposes is neither required by applicable laws and regulations or justifiable in light of our domestic energy needs.

There is only one entirely accurate indicator, at any given point in time, from which a specific need for resumed federal leasing levels can validly be inferred by the Department. That indicator is the existence of willing potential lessees. If there is no such willing applicant for a federal lease, model projections of supply and demand will not result in the issuance of a single new federal lease.

By contrast, if there is such a willing potential lessee, and a policy to encourage increased or accelerated utilization of domestic energy resources remains a national priority, there would appear to be no valid argument against the issuance of a lease.

This theoretical argument in fact reflects the current market situation with respect to federal leases. Recent reports by the Department of Justice and the Federal Trade Commission have highlighted both the existence of demand for new federal leases and the adverse effect upon enhanced competition and renewed market entry possibilities within the industry which the current leasing moratorium has produced.

We see no reason why the preferred Program should provide that the Secretary may set or adjust regional production targets, or allocate such production between or among regions, in such a fashion as to deprive any potential lessee of the opportunity to develop federal coal for which he believes he has a market. To enforce such arbitrary limitations upon leasing under the present

circumstances would have the inevitable inflationary effect of sustaining a high market price in a tight supply demand situation, and tend to inhibit enhanced competition in the market place.

Either result would be in direct contravention of clear national policy. Under the current system of environmental protection and controls, and in light of existing federal, state and local assistance available to alleviate socio-economic consequences of development, no valid public policy justification for restraints upon the level of resumed coal leasing would appear to exist.

-RECOMMENDATION-

We recommend that specific target levels not be set as determinants of levels of leasing. We recommend that production levels estimated by the federal government be viewed only as threshhold estimates of possible future demand. Appropriate levels of resumed future coal leasing should be those determined by the existence of potential lessees and the levels of production represented by such proposed leases and other specific indications of interest by industry, state and local governments.

We emphasize that in making this recommendation we do not suggest that the Department adopt a program such as is described in the DES in its discussion of the program known as EMARS II. As described in the DES, such a system would have had limited the ability of the government to determine where development of federal resources would be most desirable and appropriate. Adoption of a program as so described would represent an abnegation of the federal government's clear responsibility to exercise discretion with respect to leasing.

As proposed by NCA, however, the determination by the Department of the existence, extent and geographical location of areas of particular interest to potential developers would be a major but not necessarily unique starting point in the analysis of the need for the issuance of additional federal leases. All other appropriate review, analysis and balancing steps could still take place, but a starting place would have been adopted which would simultaneously both establish the presumptive need for additional leasing and serve most efficiently to focus available federal attention and resources upon specific areas or regions.

(b) Timing of Setting Targets

Serious problems are presented also by virtue of the fact that the assignment of regional production targets occurs under the Program only after the completion of the land use planning process and the first stages of the activity planning process. As a result, there is no opportunity presented whereby the decisions made prior to the assignment of production targets may take into account the actual quantities of coal which will be required to be produced from the areas in question. Throughout the decision-making process whereby lands might be declared unsuitable for mining or whereby resource trade-off decisions which will commit federal lands to other uses inconsistent with coal development, no coal value of the lands may be taken into account. No effective balancing of the value of such lands for coal development can therefore occur.

Moreover, the DES does not discuss the adverse impacts that will result from the scheduling of this element of the planning process so late as to prevent a meaningful application of the statutorially mandated principle of multiple use-sustained yield. Section 3.2.3., "Setting Regional Production Targets," merely repeats the manner in which such targets are intended would be set. It further notes only that they would be used by federal and state governments "to set data gathering and planning priorities to ensure that a sufficient number of tracts would be delineated and that adequate site specific information would be available to make the regional ranking and selection process workable" but immediately adds "They would be flexible,...with the final targets actually being developed as part of the analysis in the ranking and selection process." (DES, at 3-23.)

-RECOMMENDATION-

Any production targets to be used by the land manager at any time in the planning process must be identified and referenced to a specific region so as to enable them to be used during any process which assesses values or assigns priorities to or among competing resource uses.

(c) Tract Selection and Ranking.

Although not separately treated in Chapter 3 of the DES, procedures whereby the actual boundaries of lease tracts, and the ranking of those tracts in a subsequent lease offering, have been addressed by the SEcretary and preliminary decisions have been made. See, Summary of Decisions, July 27, 1978, Issue B-2 and Issue D-4.

Under this element of the Program, industry interest would for the first time be formally solicited. This will occur, however, only after the pool of all available land has been winnowed down by (1) land use planning for all other resources and (2) screening of remaining lands to delete those "unsuitable" for mining.

Of remaining areas, industry will be allowed to indicate which are the "best" leasing tracts, but not proposed lease boundaries. Lease boundary selection will be based in an unknown fashion upon the amount of coal "needed", the public body question, the intertract bidding decisions, any veto authority given to states, the opinion of the Attorney General upon anticompetitive results, etc.

The "ranking' of those areas left after completion of both the land use planning process and application of the lands unsuitable criteria would appear constitute one last procedural step whereby lands otherwise available might be excluded from leasing based on "State desires, reclaimability, coal economics, etc." Moreover, Departmental representatives concede that in those areas where MFP planning is now well advanced, even this limited opportunity to so "comment" may not be offered, although all such MFP's will in fact be re-reviewed according to the new "suitability" criteria.

Moreover, each of the indicated elements that go into "ranking" would appear arguably to the province of other bureaus or other procedures than BLM's leasing process (e.g. "reclaimability" would properly be subject to the judgment of USGS and OSM, at the time of mine plan submission).

Concessions by DOI that "ranking" may only be possible at the area level instead of the smaller tract unit based upon data available highlights a fundamental problem with the Program in the real world already noted throught these comments: not nearly enough is known about all federal holdings to enable even earlier stage decisions to have been made, much less "ranking" in the detail here proposed.

-RECOMMENDATION-

"Ranking" mechanisms should be substantially clarified, and opportunities for industry to determine lease boundaries provided earlier in the Program.

C. OTHER COMPONENTS OF THE PREFERRED PROGRAM

In addition to the above mentioned concerns regarding the land use and activity planning processes described in the DES, we believe there are several additional elements of the preferred Program which would be unacceptably difficult to implement, and which would frustrate any determination to resume federal coal leasing. These issues relate to the pre-lease planning mechanisms, the contents of a proposed lease under the federal program, the methods by which lease sales might be conducted and, finally, the proposal that the Department's newly developed screening and management processes be applied to existing leases and preference right lease applications (PRLAs).

Not all of these issues are of equal importance or would have equally adverse effects upon the success of the proposed Program. Our comments will be addressed in the order in which the specific questions arise in the DES.

Finally, we note the effect of the Program upon the applicability of NEPA to coal leasing.

(1) Split Estate Leasing and Surface Owner Consent. The respective rights and responsibilities of the federal government in those areas where a federal coal estate has been retained in government ownership after alienation of the overlying surface has been one of the most controversial and highly publicized issues to arise in recent years. It resulted in the enactment of Section 714 of SMCRA, which in essence provides that no coal lease shall be issued for surface mining unless the surface owner, if qualified, has consented thereto. This class of "qualified" surface owners includes only persons who have, for at least three years prior to the granting of the consent to mining, held title to the land surface, and have either had their principle place of residence, or personally conducted or received significant income from farming or ranching activities on the land.

As described in the DES, the preferred Program would extend the protection of the Act to qualified surface owners, recognize that other surface owners might be entitled to protection under state law, and in addition utilize regulations to be issued under the Mineral Leasing Act to police the actual form and content of surface owner consents.

fails to distinguish between private surface owned by a coal company, which would not be eligible for protection under the surface owner consent provisions of SMCRA, and private surface owned by a qualified owner.

No preference should be set for federal surface ownership lands over those lands in which a coal company has purchased outright the surface estate. To establish such a preference would penalize unnecessarily and unjustifiably those companies which have prudently continued to attempt to put together logical mining units during the leasing moratorium, and in reliance upon the probability of resumed federal coal leasing. In such cases, such companies would clearly be in a position most effeciently and quickly to develop the federal coal resources involved. As long as fair market value is established and an adequate return to the government thus assured, no public interest is served by creation of a bias against the issuance of such a lease.

-RECOMMENDATION-

No preference for federal over company surface ownership should be included in the Program.

Other discussion in the DES of each of these issues is confusing. As we understand the preferred Program, the above mentioned review and Secretarial constraints would be applied only where a qualified private surface owner is involved.

In such circumstances, the form and content of the consent would be reviewed and no lease sale would be conducted unless by its terms the consent were transferable. The DES states at page 3-41 that a consent would be considered "transferable" only if it provides for payment or reimbursement, as appropriate, in the amount of the "purchase price of the consent."

We question whether this provision might be subject to abuse. On the one hand, a market could develop whereby surface owner consents would be granted at artifically inflated prices, for the sole purpose of subsequent brokerage at such inflated prices to a bidder who might require the coal involved to complete a logical mining unit.

If intertract bidding were to be utilized, the effect of such a transaction could be seriously to reduce the capital available for the bid, and thus the lease offering itself. In such case, necessary federal coal leases might be lost or federal coal bypassed due to inability of the sole authentic bidder to compete on an intertract basis with another potential lessee not so financially constrained.

By the same token, requiring that the consent be transferable at the original cost could operate inequitably where a party may in good faith have obtained a consent at some time in the past, and the value of consent has materially increased as a result of market conditions. In such case, the holder of the consent might now be required to convey the same at a price significantly less than the market value and thus lose both the coal involved and the true value of the original consent as well.

-RECOMMENDATION-

Provisions for transferability of a consent should be redrafted so as to provide for transferability in such a way as to recognize the fair market value of the consent at the time of transfer.

(2) Lease Stipulations.

As described in the DES at page 3-25, the Department would propose to include environmental stipulations for each proposed lease. In the decision documents, the Secretary expressed a preference that the Department reserve the right to add additional lease terms and conditions as further environmental information became available. (DES Table 3-3, at page 3-32.)

There would appear to be no statutory authority whereby the terms and conditions of a lease as originally issued might thus be subject to the unilateral imposition of additional terms at a later date other than that of the renegotiation anniversary.

In addition, there would appear to be no need for the reservation of such authority, either in the regulations or as a matter of contract between the Department and the lessee. To the degree that changed environmental information might disclose the need for the formulation of specific performance requirements, the imposition of such requirements may most effeciently be reviewed and undertaken through the mechanism of the approval of the mine plan.

The stated purpose of this review would be twofold: to ensure that the financial considerations involved in the consent are not so high as to significantly reduce the market value of the lease, so that a fair market return might not be achievable by the government. Second, to ensure that the competitive nature of a potential lease offering is not jeopardized by the existence of such consent.

In this regard, the DOI assumes that where a surface owner consent has been issued or is in question, no one other than the owner or grantee would bid on a lease. In such cases, the Secretary would be prepared to explicitly exercise discretion not to conduct the lease offering.

We strongly disagree with this inference that the existence of a surface owner consent question precludes a competitive lease situation. We strongly suggest that the existence of such a question is irrelevant to the question of competitive status in the real world.

-RECOMMENDATION-

Where a consent has been issued, the Department should infer only interest in the tract, and encourage development by offering such area for a lease.

In addition, the decision documents we have reviewed indicate an additional element not specifically addressed in the DES. On June 30, 1978, the Secretary is reported by the Department to have expressed a preference that lease tracts be ranked for sale in the following order: federal surface first, coal company owned surface second, and private surface last. See, "Summary of Preferred Alternatives," July 18, 1978, at p. 9.

The DES does not appear specifically to address the decision by the Secretary to rank potential leases so that federal surface would be preferred to "coal company surface." At page 3-24, the DES states that a "preference would be accorded tracts where the surface is federally owned in favor of tracts where the surface is in private ownership (other factors being nearly equal)..." We respectfully submit that this language does not adequately describe the preference expressed by the Secretary. It

-RECOMMENDATION-

The Program should provide that changes required due to changed conditions should be provided for in the mine plan, and at the time of approval thereof.

(3) Fair Market Value.
We have significant reservation as to the validity of the use in all cases of discounted cash flow analyses to evaluate the fair market value of any given lease. As we understand the Program, it would require the preparation of a complete pro forma financial statement prior to lease issuance. However, the actual financial conditions under which a property might be developed could change drastically between the time of lease issuance and actual development. In addition, previous experience with discount cash flow analyses has produced significant variance between and among the values assigned by Departmental officers and those of the producers, and widely different bids on proposed leases involving substantially similar quality and quantities of coal.

-RECOMMENDATION-

The discount cash flow analysis should be set forth as one method only whereby fair market value might be established, and explicit recognition be given to alternative methods of calculating the same may be used at the request of a potential lessee.

(4) Maximum Economic Recovery.
Of all of the specific decisions tentatively reached by the Secretary, the requirement that each lease by its terms identify and require the "maximum economic recovery" of the resources involved is the most objectionable. It is discussed in the DES at page 3-41, without elaboration or explanation.

As so described, this element of the preferred Program would be impossible to implement. It would assume that the Department would be able to determine, prior to lease issuance, not only the quality and quantity of all reserves in the lease, but also the actual market price at which the coal involved would be ultimately sold. As adopted by the Secretary, each lease would require the mining of "all coals seams which are collectively profitable." (DES, at 3-41, Table 3-3 at 3-32.)

This element of the program has been adopted in ignorance of the manner of which coal is mined and sold. It is not possible, in many cases even during the operation of a mine, to determine with specificity the price at which any given seam will be sold. Commonly, where multiple seams are involved, multiple contracts will be executed over the life of the mine, at widely differing prices which reflect the actual cost of the mining of the specific coal involved in each contract. There is, therefore, absolutely no way to determine "collective" profitability.

Of perhaps greater importance, from a philosphical standpoint the option adopted by the Secretary amounts to direct federal control over the level of profits which a company developing a coal lease will be allowed to obtain. This, in turn, amounts to direct control over the price at which the coal will be sold, and represents an unprecendented administrative imposition of price controls on this segment of the energy industry. Such a requirement is neither required nor supported by statutory authority.

The concept of maximum economic recovery as now proposed by the Department far exceeds the Congressional intent in establishing such a concept, and the manner in which the Congress intended that the goal which it did articulate would be implemented.

In the FCLAA Congress made two important distinctions, which must be recognized and should be distinguished in the Program.

First, the FCLAA provides in Section 2 that in subdividing coal lands into leasing tracts, the Secretary shall set the size of such tracts so as to "permit the mining of all coal which can be economically extracted in such tract."

The clear intent of this language is to ensure that tract boundaries are not set at levels other than those required to support a logical mining unit, taking into account federal and non-federal coal which may be involved.

The FCLAA separately provides in Section 3 (new Subsection (3)(C) of the Mineral Leasing Act) that before issuing a lease, the Secretary

> "Shall evaluate and compare the effects of recovering coal by deep mining, by surface mining, and by any other method to determine which method or methods or sequence of methods achieves the maximum economic recovery of the coal within the proposed leasing tract. This evaluation and comparison by the Secretary shall be in writing but shall not prohibit the issuance of a lease; however, no mining operating plan shall be approved which is not found to achieve the maximum economic recovery of the coal within the tract." (emphasis supplied)

By this provision of the FCLAA, Congress created two distinct mechanisms relating to "maximum economic recovery."

The first, and the only such mechanism applicable to the terms of a lease itself, is clearly designed to ensure the accurate determination of which and by what sequence of mining methods (surface, underground or other, e.g. auger) would extract the maximum amount of the federal coal resource involved in the lease. This was clearly not intended to be an essential element of a lease, and the absence of such a finding "shall not prohibit" lease issuance.

The second and clearly distinct mechanism relates only to the approval of a plan of operations. In this context, it amounts to a ratification of the long standing provision in Departmental regulations that, in the approved plans for ongoing operations, a reasonable balance be drawn so that federal coal resources are not left in the ground as a result of "highgrading" the deposit so as to extract only the lowest cost coal.

In the proposed Program, the Department blurs all distinctions between these three concepts. By providing that the lease itself determine and require what will be the required maximum economic recovery, the Department ignores the separate and distinct purposes to be served by each of the above statutory provisions: the division of land into lease tract sizes that will maximize recovery of the resource and minimize the bypassing of federal coal; the determination as to which mining method will maximize recovery of the resource and minimize bypass; and the traditional application of discretion in the mine plan itself to balance the cost and benefits of the recovery of specific coal areas based upon the economic conditions existing at the time of mining.

The Congress clearly did not intend the result that would occur under the Department's proposal. Indeed, the legislative history indicates a Congressional intent that the appropriate mechanism would be one whereby an operator might be encouraged to produce coal otherwise uneconomical to mine, by means of a reduction of the otherwise applicable royalty under Section 39 of the Mineral Leasing Act of 1920, which was not amended by the FCLAA. This preferred mechanism was expressly described as extending even to a case in which the Secretary might lower a royalty even below the minimum royalty otherwise required, "for the purpose of encouraging the greatest possible recovery of coal." See, Correspondence of Senator Metcalf and Congresswoman Mink, June 24, 1976 to the President, supra.

As now proposed, provision for determining and requiring maximum economic recovery as defined by the Department would be impossible to implement, unreasonable to require and in excess of any reasonable interpretation of the term as employed by the Congress.

-RECOMMENDATION-

Requirements for provision in the lease for a determination of specific levels of "maximum economic recovery" should be deleted from the Program.

(5) Sale and Bidding Methods (DES, at 3-25).
The preferred Program would contemplate the use of "intertract bidding" to supplement or increase the competitive nature of a lease offering. Although not extensively described, we understand the concept of intertract bidding to be analogous to that previously employed by the Department on an experimental basis in connection with the offering of oil leases on the outer continental shelf. As so employed, it would involve the awarding of leases based upon a comparison of the value per ton of bids tendered by sole bidders for different tracts.

As so understood, we seriously question whether this mechanism could be successfully employed. It would require a greater knowledge than the Department is known to possess concerning the actual quantity of reserves which would be contained in each of the tracts involved.

Moreover, coal lease offerings are significantly different from oil lease offerings. In the former case, the physical and chemical characteristics of coal may differ widely between and among tracts and even within a single tract. By contrast, oil leases subject to intertract bidding would commonly involve the tapping of the same geologic structure and the production of virtually identical oil reserves.

The Secretarial decision documents indicate that some adjustment might be allowed in comparing the per ton value of bids submitted in an intertract competition based upon the known physical and chemical qualities of the different coals involved. This would not, however, be adequate to compare validly the respective bids. Each potential lease will involve different costs of production, including environmental and transportation costs, which would be reflected in the overall bid but which would not be accurately accounted for in the calculation of the per ton value. As a result, application of intertract bidding where widely differing costs are involved between or among tracts could have the effect of awarding leases which in fact involve higher rather than lower cost coal, or greater rather than lesser degrees of environmental risk.

-RECOMMENDATION-

Provision for intertract competitive bidding should be deleted from the Program.

(6) Special Leasing Opportunities. (DES, at page 3-27). As described in the DES, the Secretary would utilize set aside lease offerings to encourage the formation and entry into the coal production market of small business entities. The example regulations attached as Appendix A (Sections 3420.1-4)(a)(2) and 3472.2-2(e)) provide a "special leasing opportunity" for such entities. We further understand the Department to intend by this provision to implement the Declaration of Policy set forth in the Small Business Act, 15 U.S.C. at 631(a), that the federal government should attempt to ensure that "a fair proportion of the total sales of government property" be made to such enterprises.

First, this question is now raised for the first time by the DES. It does not appear to have been the subject of any Secretarial decision document or process. (See, "Issue Option Papers," Table 3-2, and "Policy Options-Secretary's Preference" Table 3-3, at DES 3-29 et seq.)

We note again that the above quoted Example Regulations are specifically stated in the DES to be set forth for illustrative purposes only. As a result, they do not constitute a statement of Secretarial decisionmaking.

A DES or final EIS under NEPA does not itself constitute a formal proposal for federal action. Under NEPA and guiding principles of federal judicial determinations, an EIS is an analytic document which is required to consider the consequences and alternatives of an action otherwise proposed. Since this element of the Program would not appear to be such a formal "proposal", its inclusion for discussion at this time is inappropriate.

This is particularly important since the origin and respective arguments for and against this proposal have not been publicly disclosed. As a result, of course, it follows that the DES could not, and in fact does not, present any of the consequences or alternatives of this particular program element. As a result, any more elaborate discussion in the final EIS would not have been subject to sufficient public comment under NEPA, as applied to the Department in NRDC v. Hughes, supra.

Even if this were not the case, and without any insight into the decisionmaking process within the Department on this point, it would appear that application of the concepts of "fair market value" and "maximum economic recovery," however these terms may be finally defined by the Department, would necessarily require preferential and thus inequitable treatment of small business entities. This would flatly contravene the intent of the Secretary as expressed in his decision with respect to public body leasing. (See, Decision of June 30, 1978, decision at DES 3-33.).

Moreover, we do not agree with the apparent assumption by the Department that the issuance of a federal coal lease constitutes a "sale" of government property within the meaning of the Small Business Act. A lease is the issuance of a right to develop federal coal, and treatment of the legal consequences of such issuance as a "sale" would seriously undermine all assumptions by the Department as to its subsequent power to control, adjust or amend the terms and conditions under which development may occur.

Finally, and of perhaps greatest importance, the program element now raised for the first time by the DES is unnecessary because of, and inconsistent with, specific provisions of the FCLAA expressly designed by Congress to ensure appropriate participation by smaller entities

in any federal leasing program. Section 2 of the FCLAA amended Section 2(a) of the Mineral Leasing Act, 30 U.S.C. 201(a), and requires in relevant part that

> No less than 50 per centum of the total acreage offered for lease by the Secretary in any one year shall be leased under a system of deferred bonus payment.

This explicit provision for "deferred bonus" bidding was consistently understood and intended by the Congress to be an accomodation of concerns over the ability of smaller entities to enter the relevant market or compete with those of larger capital resources. As noted by the principle sponsor of S. 391 in his remarks upon the introduction of the FCLAA for final Senate vote,

> "S. 391 would foster competition in the bidding for leases by requiring that 50 percent of all acreage leased in any one year be under a system of deferred bonus bidding. This would allow a sort of installment plan for paying the bonus, thus reducing the front-end capital outlay necessary and enabling smaller corporations to compete with the giants....
>
> /Such a provision/ will guarantee against the possibility that the Secretary...could fail to keep in mind the disadvantageous positions in which smaller companies will find themselves. A diversified coal industry, which this amendment would foster, is certainly in the public interest." Congressional Record, June 21, 1976, as reproduced in Senate Publication No. 95-77, Federal Coal Leasing Policies and Regulations, at 115-6. See also paragraph "5" B of Correspondence, Senator Metcalf and Congresswoman Mink to the President, June 24, 1976, Ibid. at 123.

-RECOMMENDATION-

No special leasing opportunities for small business entities may be contained in the Program as finally presented to the Secretary for decision.

(7) Management of Existing Leases and Preference Right Lease Applications.
The Department would not propose to apply new criteria to determine the "suitability" of lease development to existing but non-producing leases, and to preference right lease applications (PRLAs).

Decision on the "suitability" for the development of a particular lease would, in the normal course of events, not be made until the time of submission of a mining plan. (DES, at 3-33, "Summary of Preferred Alternatives," July 18, 1978, Issues VII, VIII)

This represents a major advance beyond previous Departmental approaches. The extensive new "suitability" criteria would operate independently of the mechanism of the Program whereby new leases would be issued. It would apply broad, novel social, economic and environmental constraints to the subject leases and PRLAs.

PRLAs and leases are considered "valid existing rights," the cancellation or major restriction of which would arguably be a taking which entitles the holder to compensation. The Department appears to assume enactment of exchange lease legislation which would broaden their authority to move against existing rights.

The issue involved in this element of the Program is subject at this time to pending litigation. To the degree that the Program would anticipate the outcome of this litigation, it is inappropriate and should be deleted.

Moreover, this policy would be particularly unfair and inequitable with respect to existing leases. It would require the lessee to undertake the lengthy and costly procedures to develop a mining plan, and only after such investment of time and effort would the Department seek to apply the new criteria.

-RECOMMENDATION-

The Program should contain no provisions with respect to the imposition of constraints upon the valid existing rights represented by outstanding leases and preference right lease applications.

Applicability of NEPA Requirements to Leasing

We understand the policy of the Department to be to seek to reduce, consistent with the letter and spirit of NEPA, the total number and scope of environmental impact statements prepared with respect to federal coal development. To achieve this result, we understand the Department to be implementing a policy whereby a preexisting EIS may be relied upon at the time of mine plan approval, so as to reduce the need for or scope of the statement or environmental analysis required on the plan itself.

The overall thrust of the Program as described in the DES is to reduce significantly the rights and privileges which would be afforded to future lessees. The DES expressly notes that issuance of a lease under the Program would give no assurance or right thereafter to develop the lands involved. Separate and distinct authorization must be obtained for all development the approval of which could reasonably be construed to constitute a "major federal action" under NEPA and the applicable guidelines and regulations of the CEQ and the Department.

Section 702(d) of SMCRA does not exempt approval under Sections 508 and 523 of a reclamation plan for operations on federal lands from the environmental impact statement requirements of NEPA.

As a result, we now suggest that the mechanism which would be created by the Program eliminates the need for an environmental impact statement upon a specific lease offering.

With respect to the new Program, the DES and the subsequent final statement would constitute the treatment required under NEPA and by Order of the Court in NRDC v. Hughes, supra. The environmental and other considerations involved in the application of such a program to specific, identified geographical areas, and the coal and other resources contained therein, would be covered in subsequent "regional" EISs. Such regional EISs would treat the impacts of coal lease issuance within and among the federal coal regions, and would include NEPA treatment with respect to all geographic areas in which leasing might thereafter occur. (To the degree that subsequent leasing was contemplated in areas not so treated, new regional EIS treatment or supplements would be required.)

Thus, the mechanism of the programatic EIS and the regional EISs fulfill completely the requirements of NEPA applicable to a lease offering.

For economy and efficiency, the letter and spirit of NEPA would appear to be best served if an environmental impact statement were not to be required on a lease offering, but the requirements of NEPA fulfilled by preparation of an environmental impact statement or environmental analysis in lieu thereof at the time of mine plan approval.

-RECOMMENDATION-

The Program should expressly include and provide a Departmental undertaking that EISs under NEPA will not normally be performed upon a lease offering.

CONCLUSION

The preferred Program represents an unprecedented degree of management and control at the Departmental level of federal coal resources. Many specific elements of the Program are unworkable. If implemented, we believe it would be impossible for the Department or the private sector to achieve in timely or responsible fashion any realistic goal of resumed federal coal leasing.

The unworkable aspects of the Program appear in virtually all respects to be actions or choices within the discretion of the Department. They are not mandated by external constraints of law or national policy. As a result, the Program would appear to represent the conscious adoption by the Department of a land management policy which is systematically biased against federal coal development.

We do not believe that this result is consistent with the intent of the President, the public interest or the national policies established by the Congress in relevant legislation.

We urge the Department to reconsider and amend the preferred Program, so that the nation may have the benefit of the timely, orderly and environmentally sound development of the vital domestic energy resources represented by unleased federal coal lands.

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Coal Prog

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COMMENTS ON THE

DRAFT ENVIRONMENTAL STATEMENT

ON

THE FEDERAL COAL MANAGEMENT PROGRAM

CARY RIDDER

February 13, 1979

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INTRODUCTION

The Department of the Interior is to be congratulated for its efforts to put together a comprehensive coal leasing program. The Draft Environmental Statement (DES) on the Federal Coal Management Program published by the Department represents a significant improvement over past documents on the federal coal leasing program. Among the important issues that this document addresses which were previously ignored are 1) the recognition that there is a difference between the need for a coal management program and the need for increased leasing, 2) the recognition of the need for a coal management program based on land use planning policies, 3) the acknowledgement of the need to actually involve the public in the decision making process and 4) the inclusion of the concept of threshold limits in the program. The Citizens' Coal Project (CCP) of the Environmental Policy Institute, however, does have concerns about several major components of the DES.

NEED FOR NEW LEASING

The first concern is whether the need for more federal coal leasing is adequately assessed. This is very important because the determination of the extent to which more federal coal needs to be leased will have a tremendous impact not only on the development of western coal but on the development of midwestern and eastern coal as well. The CCP is concerned by what it perceives to be weaknesses in the DES in both its analysis of existing and fuure energy supplies from sources other than coal and in its specific analysis of the projected demand for coal through the year 2000.

The CCP agrees with statements in the DES that as other fossil fuels become scarcer and more expensive to obtain, coal, and potentially western coal, will play an increasingly important role in the United

States' future energy scenario. There is a question, though, as to how much and how fast the demand for coal will grow. The demand for coal is intimately related to the growth in the demand for electricity, because the most rapidly growing market for coal is in its use for electrical power generation. So, the question becomes, how much will the demand for electricty grow and how much of that growth will be supplied by coal?

ELECTRIC POWER DEMAND

TheDES does not adequately discuss the predicted growth of electric power demand. There is no discussion of the recently depressed rate of construction for new electric power plants nor are there any tables illustrating the demand trends the Department clearly anticipates. This simply illustrates the basic problem with the analysis used in the DES. The DES uses a traditional model for demand projections which does not adequately address the issue of whether or not the projected need for western coal development should reflect recently changed marketplace demand trends or be based upon econometric models which merely use past consumption rates to extrapolate future electricity needs. Recent developments in the markets for coal and electricity make reliance on thelaster analytical process increasingly untenable. For example, in the Eastern Coal Region, coal production has dramatically decreased due primarily to the unanticipated drop in the market demand for coal. In the January 1, 1979 issue of Coal Week, the Tennessee Valley Authority, considered by coal companies to be the buyer of "last resort", reported that this year it had received the largest number of coal bids in nearly four decades of buying coal. According to market analysts, "...this event confirmed that eastern operators may be producing far too much coal." Between 1970 and 1975, projections of total energy growth through the turn of the century were reduced from approximately 160 - 200 Quads to

a range of 100 -135 Quads (with at least one major model projecting a low growth rate of less than 80 Quads). In the electrical sector, which represented more than 65% of the total coal consumption in 1977, utilities have reduced projections of needed capacity additions each year since 1973. A recent article in The Wall Street Journal (February 7, 1979) reported that since 1973, the Potomac Electric Power Company has reduced its projections for new generating capacity for 1982 from 4.4 million kilowatts down to 1.2 million kilowatts. Its growth rate has dropped from 9% annually (1973) to 3%. This is not a unique situation. A yet-to-be-released study by Arthur D. Little, inc., Implications of Lower Electric Power Growth Through 1990, concluded that the annual growth rate for utilities through 1990 will be 4%, a significant drop from the 7% predicted a few years ago. This figure is also lower than the electric power annual growth rate predicted by the Department of Energy (DOE) model used by the Department of the Interior (DOI) in this study, which was 4%, 4.8% and 5.8% for the 1985 low, medium and high projections, respectively (p. 2-24). Clearly, we are in a new era in which we cannot rely on historical extrapolations. The continued failure of econometric models such as the PIES model (used by DOE to formulate the demand projections for the DES, Chap. 2.6.2) to project post-embargo growth patterns have forced analysts to acknowledge the inability of current modeling techniques to predict future demands.

MODELING TECHNIQUES

he CCP recommends that the Department reevaluate its demand models and consequently its determination of the need for more coal leasing. First, we recommend that the current modeling technique be tested by "backcasting"; that is, taking data from previous years, plugging it into the model and

comparing the model's results with the actual coal demand figures for those years. The results from those tests should be made publicly available.

Second, we recommend that DOI prepare forecasts of electricity demand based on an anlysis of future end uses of electricity. This methodology is an analysis of each major "end-use" of electricity in the residential, commercial, manufacturing and agricultural sectors. An analysis of "end uses" affords the most direct basis for projecting the likely long term growth in consumption and the opportunities for increasing the efficiency with which electricity is used in each instance. The advantage of using this methodology instead of an econometric analysis is that an econometric analysis does not allow explicit consideration of the impact of regulations and standards which require improvements in the efficiency of electrical energy use. (Beers, Roger & Lash, Terry, Choosing an Electrical Energy Future for the Pacific Northwest: An Alternate Scenario. Energy Research & Development Administration, Washington, D.C., January, 1977, pp. 13 -15) As acknowledged on page 2-25. California is currently using this analytical technique and, while the CCP recognizes that such an analysis is enormously expensive, nonetheless, we believe that it should be done because the miscalculations of the traditional model would lead to far greater costs to society in the long run.

ALTERNATIVES TO COAL: OIL, GAS, SOLAR AND CONSERVATION

OIL AND GAS:

Also, in chapter 2, the DES inadequately anlyzes the future energy supplies from sources other than coal. The Natural Gas Act of 1978 has succeeded beyond all expectations in releasing gas from the intrastate market, where there was an oversupply of gas, to the interstate market, where there was an undersupply. This has led DOE to encourage utilities to keep burning gas for an indefinite period of time rather than encouraging

them to convert to coal, as was past policy. Also, while it is true that the production of oil is declining, there has been a decrease in the rate of decline. Moreover, the DES fails to mention an area of great potential for conventional oil and gas discoveries, the Overthrust Belt in theRocky Mountains. In the western states, these emerging oil and gas supplies will compete with coal for the industrial and power plant market and with electricity for the end use consumer market, precisely the markets in which it is anticipated that federal coal and electricity derived from coal willbe sold. The DES also fails to adequately analyze the impact of Mexican and Canadian oil and gas on future coal demand. In section 2.5.2, Canadian gas is not even mentioned as a potential source of fuel, although recent discoveries in Alberta have greatly enlarged Canadian gas reserves. In short, there is insufficient analysis to determine how much coal demand would be displaced by the additionaloil and gas supplies which currently appear to be more available than was anticipated even a year ago.

SOLAR

In respect to Nontraditional Energy Sources (2.5.5), the DES discussion of the potential for solar energy to supply a significant portion of our total energy needs is inadequate. The DES suggests that by the year 2020, 10% of our total energy needs could be met by solar sources. The President's Council on Environmental Quality, however, in its April 1978 report on solar energy, Solar Energy, Progress and Promise, said that "... under conditions of accelerated development and with a serious effort to conserve energy, solar technology could meet a quarter (25%) of our energy needs by the year 2020." (p.iv). And a soon to be released Federal Domestic Policy Review Report on solar energy, ordered by President Carter

on May 3, 1978, suggests that an aggressive federal program could lead to production of 20 Quads per year. This would be 20% of our total energy demand if demand were to reach 100 Quads by the year 2000.

CONSERVATION

A more rigorous analysis in the DES of the potential role of energy conservation is also necessary. Such factors as the recently enacted federal guidlelines for electric utility rate setting policies and practices and state initiatives in this area are likely to reduce the growth in the demand for electricity below most projections based on a very different historical context of regulatory policy. And the rising price of oil may simply reduce consumer demand and encourage conservation rather than force conversion to coal as has beenassumed by DOE. Because electricty is the highest cost form of energy, consumer reductions in demand due to increasing energy prices are likely to be especially reflected in reduced demands for electricity and therefore have a significant impact on the continuing demand for coal.

Until a more thorough analysis is done of these basic assumptions used to justify the need for more federal coal leasing, the CCP will not support additional leasing of federal coal.

DESIGNATION OF LANDS UNSUITABLE

An area of great concern to the CCP is the process and criteria used for designating lands unsuitable. The CCP strongly supports the concept of requiring areas to go through two designation processes: one a regional designation process administered by the Bureau of Land Management (BLM) prior to leasing and the other, a site specific process administered by the Office of Surface Mining during the review of the mine plan. We also support the inclusion in the criteria of the concept of an "appropriate buffer zone." This allows a determination to be flexible and take into account various factors such as differing geography or individual species habitat needs.

The process described in thepreferred alternative, does not require an inventory analysis or a cumulative impact review to be done after the specific criteria have been chosen for an area. The CCP recommends that there be a requirement for a comprehensive analysis, which would review the overall cumulative impacts of all the chosen criteria after the process of designating lands unsuitable is completed. And there should be specific directions, with clear standards, given to the land manager so that at the end of a review, if there is a challenge to a decision, the mechanism for appealing that decision is understood by everyone. The CCP also recommends that after land has been designated unsuitable, each land manager should be obliged to make available to the public information regarding what data was used (with minimal requirements for the data base) and how the decision was reached.

THE CRITERIA

The following are comments on the specific criteria and exceptions.

We do not agree with the general exception on underground mining. Underground mining has surface effects such as subsidence and impacts on water qulaity and these should be included in any review of the impacts of mining in an area.

Federal Lands Systems: We concur with the criterion and the exception.

Rights of Way and Easements: We concur with the criterion. In the exceptions, consent should be obtained from all parties involved for all the exceptions. The second exception should include a phrase saying it was "granted for that type of mining."

Buffer Zones: The criteria should reflect the language of SMCRA and read "public building, rather than'occupied' building." The exception should also reflect the intent of SMCRA by including the language of section 522 (e)(4) stating that the public road may be relocated only after

> public notice and opportunity for public hearing in the locality a written finding is made that the interests of the public and the landowners affected thereby will be protected.

Wilderness Study Areas: The CCP concurs with DOI's interpretation of FLPMA in the criterion and the exception.

Scenic Areas: The CCP concurs with DOI's interpretation of FLPMA, sections 201 & 202 & section 522 (a)(3)(B) of SMCRA. The exception, however, gives the land manager broad discretionary power which does exist in the law.

Lands Used for Scientific Studies: We concur with DOI's interpretation of SMCRA & FLPMA. Again, the exception allows for broad discretionary authority not specified in the law.

Historic Lands & Sites: We concur with the DOI's interpretation of SMCRA 522(a)(3). The language of the section for the exception should comply with the language in SMCRA 522(a)(3) which allows for an exception only if

"...approved jointly by the regulatory authority and the federal, state or local agency with jurisdiction over the park or the historic site."

Natural Areas: We concur with the interpretation of the Historic Sites Buildings & Antiquities Act of 1935 criterion. We do not concur with the exceptions, and the Archeological & Historic Preservation Act of 1974 which are not founded in law and only serve to weaken the existing protection for these areas.

Federal Endangered Species

State Endangered Species

Bald & Golden Eagle Nests

Bald & Golden Eagle Roost & Concentration Areas: We concur with the criteria proposed for the protection of federally endangered species, state endangered species and Bald & Golden Eagles. In all four of the criteria, however, the exceptions are not based on statutory authority and only serve to weaken existing law protecting the wildlife.

Falcon Cliff Nesting Sites & Migratory Birds: We concur with DOI's interpretation of the Migratory Bird Treaty Act for the criteria and the exceptions.

State Resident Fish & Wildlife: We concur with DOI's interpretation of the Fish & Wildlife Coordination Act (16 USC 661-667(a)) for the criteria. We concur with the interpretation of Executive Order 11990 for the criteria. For the exception, we suggest that the exception comply with the language of the Executive Order and allow mining to occur in a wetland when there is "no practicable alternative." The burden of proof for the "practicable alternative" and for the determination of significant values in exception 2 should be with the industry.

Floodplains: We concur with the interpretation of Executive Order 11988

for the criteria and the first exception. Again, we suggest for the second exception that the burden of proof lie with the industry.

Municipal Watersheds: We concur with the interpretation of the Safe Drinking Water Act for the criteria. While the municipality is permitted to grant an exemption where it determines that such an exemption will not "result in an unreasonable risk to health" (42 USC 3001, Section 5(a)(3)) the exception must comply with the language of the statute and require 1) a schedule of compliance by the public water system with each contaminant level and treatment technique requirement with respect to which the exemption was granted and 2) implementation by the public water system of such control measures as the state may require for contaminant.

Prime Farm Lands: We concur with the interpretation of 510(d)(1) of SMCRA for the criteria and the second exception. We find no language in the Act, however, which allows for an exception on the basis of a negative determination, as is required in the first exception. This exception should be eliminated.

Alluvial Valley Floors: We concur with the interpretation of 510(b)(5)(A) &(B) of SMCRA for the criteria. The language of the exception, however, should be narrowed to reflect the intent of 510 (b)(5)(A).

Reclamation: We concur with the interpretation of SMCRA for the criteria. The basic assumption, however, governing the decision making process should be that the land is not reclaimable until proven otherwise.

CONSISTENCY WITH SMCRA

The BLM criteria to be consistent with SMCRA should include standards for protecting aquifers, aquifer recharge areas and natural hazards lands.

MULTIPLE USE MANDATE

A shortcoming in the criteria is that they do not consider uses for land other than coal development. In the Federal Land Management and Policy

Act of ;976 (P.L. 94-579), under section 202(c), the Secretary is instructed to develop and revise land use plans using the "principles of multiple use and sustained yield." The lands unsuitable criteria in the preferred program do not reflect this mandate. Alternative resource values, such as the use of the land for grazing purposes are neglected due to the overemphasis on coal production. The CCP urges DOI to revise the criteria to reflect this broader mandate of FLPMA.

SURFACE OWNER CONSENT

NEGATIVE RESPONSE

The CCP has two concerns regarding the description in the preferred program and the sample regulations for surface owner consent. The first of these is that in the preferred program a negative response from a surface owner as to whether or not he /she wants to lease his land has the effect of a non-binding response. Unlike positive responses, which are treated as permanently positive answers, a negative response is treated as a conditional response which will be subject to continued requests to sell or lease and will continue to be part of the coal development plan despite the negative response. In the planning process described, even if a surface owner indicates that he is opposed to offering his land for lease or sale, he may still find that the coal reserves beneath his surface are still being offered for sale. All through the system, it is apparent that "no" is treated by the department as a provisional "no." On page 3-21, section 3.2.1.3, description of surface owner consultation, the DES says

> "The Department would, to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining in areas where a significant number of qualified surface owners state a preference against the offering of the deposits for lease. Although sections of these areas might still be designated as acceptable for further consideration for coal leasing, the land use plan would contain the recommendation that no leasing take place in the area unless there are no acceptable alternative local areas available to meet an agreed upon target for the entire production region. If the individual surface owner indicated a definite preference against the leasing of the deposit underlying his surface that deposit may be eliminated from further consideration for leasing."

The preferred program, even after a negative response from a surface owner in the land use planning stage, continues to allow the surface owner to be subjected to additional requests to sell or lease during the activity planning stage. Again, in section 3.2.4.1 (page 3-25) the Secretary is allowed to "...determine to continue a tract without consent if it is considered important." In the regulations the State Director

> "... may determine to publish the notice of lease sale and conduct the sale for coal deposits situated in split estate lands without consent if it is determined that no tracts comparable to the affected tract can be found to offer in its place..." (#3427.2, p A-18)

IMPACT OF COMPETIVE BIDDING

Section 3427.2 (e) (1) (ii) provides for the successful bidder, after the lease sale, to be reimbursed by the company which first obtained the consent for the purchase price of the consent. This provision provides for the reimbursement of the purchase price of the consent, but excludes reimbursement for the costs of obtaining the consent of the surface owner. It appears, therefore, that Section 3427.2 (e) (1) (ii) undercuts the competitive bidding process mandated by Section 201 (a) (1) of the Federal Coal Leasing Amendments Act of 1976 (P.L. 94-377).

Under the preferred program's procedures for reimbursing companies which have obtained written consent, only those companies which are certain to be successful in the bidding process or which have a special interest or decisive advantage over competitors in the bidding process are likely to assume the risks and costs associated with obtaining the consent of the surface owner.

DOI has addressed the problems of administrative costs associated with obtaining consent of surface owners in Section 3.3.4 (Split Estate Leasing Issues-Surface Owner Consent). But, just as DOI appears to have opted for another party ("the industry") to assume these costs of obtaining surface owner consent, it seems that "the industry" whould share the same disincentive as DOI to assume these costs, unless there existed particular conditions of advantage leading to success in the bidding process.

PROTECTION FOR SURFACE OWNER

There are no provisions in the preferred program or the sample regulations which protect the surface owner from harrassment or from incomplete, inaccurate or misleading information by "the industry" representative who solicits the written consent. A surface owner is ultimately assured greater protection, or at least a greater opportunity of redress, in cases of abuse and harrassment when the responsibility rests with the government not "the industry." The preferred

Nowhere in the preferred program is a negative response enough to stop the leasing process from occurring on that specific tract of land. This is contrary to the intent of Section 714 of the Strip Mine Act (PL 95-87). The CCP recommends that a negative response from a surface owner during the land use planning stage be accepted by DOI as the surface owner's definitive decision unless otherwise notified by the surface owner.

ACQUISITION OF CONSENT

The Project's concern is the process in the preferred alternative for the acquisition of written consent. The preferred program sets up a multi-tiered system for the purpose of obtaining surface owner consent. First, DOI consults with the surface owners of split estate lands during the planning process. This, in theory, forms a screen to identify lands that should not be leased (section 3.3.1.3). Then, in the activity planning stage, "industry" is specifically identified by DOI as the party responsible for acquiring surface owner consent, whether or not a surface owner has indicated a preference for leasing (section 3.2.4.1).

The procedure is not founded in the law. In 714 (c) of SMCRA the first sentence states

> "The Secretary shall not enter into any lease of federal coal deposits until the surface owner has given written consent to enter and commence surface mining operations and the Secretary has obtained evidence of such consent."

In the "Definitions", section 701 (23) the "Secretary" is defined as "the Secretary of the Interior, except where otherwise described." The Secretary in Section 714 (c) is not "otherwise described." The intent of Congress in this section is clear: the Secretary, not "the industry," is responsible for obtaining surface owner consent. The first sentence of Section 714 (C) contains two conjunctions, rather than disjunctions, thereby making it impossible to conclude that any party other than DOI has been charged with the responsibility of obtaining the written consent of the surface owner.

program creates an atmosphere which encourages harassment of the surface owner. Even under those circumstances where "the industry" is presenting the surface owner with complete and accurate information which is not misleading, the surface owner under the preferred program is defenseless against persistent requests by "the industry" to sell lease despite repeated negative responses.

Paragraph (a) of section 3427.2 of the sample regulations not only fails to protect surface owners but without question violates the letter and intent of section 714. There is no foundation in section 714 or its legislative history for the exception provided in paragraph (a) that:

> "...the State Director may determine to publish the notice of lease sale and conduct the sale for coal deposits situated in split-estate kinds without consent if it is determined that no tracts comparable to the affected tract can be found to offer in its place and that the successful bidder may be able to negotiate successfully for written consent from the surface owner following the lease sale and before execution of the lease."

SPECIAL LEASING OPPORTUNITIES

DOI is compelled by statute to "reserve and offer a reasonable number of coal lease tracts as special leasing opportunities." (3.2.6) The CCP recommends 1) that there be a stipulation in the regulations which provides for a preference to exclude public bodies from bidding for coal for power plants in which investor owned utilities are participating, and 2) that "reasonable number" be more clearly defined. The determination of "reasonable number" should be tied to the utilities boiler requirements for the generating capacity of their public systems.

REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS

In the preferred program, no requirement is made for a site specific environmental impact statement (EIS). Rather each regional sale statement will include an analysis of both the site specific and intraregional cumulative impacts of the proposed leasing programs. The CCP urges DOI to comply with the regulations promulgated by the President's Council on Environmental Quality in November 1978 and, specifically, to comply with all the criteria for an EIS. The CCP considers the construction and operation of a coal mine to be a major action on federal lands and, as such, requires an EIS.

CONCLUSION

The CCP considers the preferred program described in the DES to be a good base for a comprehensive leasing process. As discussed in these comments, the CCP is concerned by several major weaknesses in the program. We are also concerned by the time frame in which the program is being implemented. Already certain aspects of the preferred program are being implemented even though the Secretary has yet to officially pick a program and finalize regulations for it. Undue haste in implementation can only emphasize the weaknesses in the program where a broader time frame would give DOI an opportunity to carefully consider the many alternatives and to choose the best program to manage federal coal in the decades to come.

PETER KIEWIT SONS', INC.

One Thousand Kiewit Plaza
Omaha, Nebraska 68131

February 12, 1979

Director (140)
Bureau of Land Management
U. S. Department of the Interior
Washington, D. C. 20240

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RE: Comments on Draft EIS
For The Proposed Federal Coal Management Program

Dear Sir:

After reviewing the draft environmental impact statement on the proposed Federal Coal Management Program, we, at Peter Kiewit Sons', Inc., feel that the draft EIS is inadequate in its discussion of coal lease exchanges, particularly the Department's policies and procedures concerning exchange of Federal and fee coal located within alluvial valley floors.

Since the Office of Surface Mining has issued guidelines and proposed regulations for identification of alluvial valley floors which has resulted, in effect, in the identification of alluvial valley floors in the majority of proposed coal operations in the West, the Department of the Interior should address the exchange issue more thoroughly than it has done in the draft EIS.

The inadequacy of the discussion of the exchange is particularly disturbing in view of the express mandate of Congress that such an exchange program be developed. Section 510(b)(5) of the Surface Mining Control and Reclamation Act of 1977 (30 USC 1260(b)(5)) states, in part:

> "It is the policy of the Congress that the Secretary shall develop and carry out a coal exchange program to acquire private fee coal precluded from being mined by the restrictions of this paragraph (5) in exchange for Federal coal which is not so precluded."

I.

The first area of concern that we have is the initiation of an exchange and the timing of such a proposal. Specifically, who should initiate the fee coal exchange? Will the Department of the Interior, through the Bureau of Land Management's land use planning efforts, approach the fee coal owner and/or lessee concerning an exchange? Or will the fee coal owner and/or lessee have the burden of initiating the exchange?

Our position is that both the fee coal owner and the fee coal lessee, as well as the BLM, should have the right to initiate coal exchange procedures. The fact that a fee coal owner or lessee initiates the procedures should not mean that they must automatically bear the cost of the exchange procedures.

In conjunction with the above, the Department of the Interior has not made it clear in the draft EIS as to how the coal exchange program fits into the overall context of the "preferred alternative" for the Federal Coal Management Program. For example, will the Federal coal available for exchange purposes be included in reaching final regional production targets under the Federal Coal Management Program? Will a BLM land use study be required prior to exchanging Federal coal under the Federal Coal Management Program? Will the Federal exchange coal be subject to regional tract ranking selection and scheduling similar to that for leased Federal coal? What role will the public have in any coal exchange program? Will the unsuitability criteria be applied to all lands proposed for exchange prior to such an exchange taking place? Would there be a maximum acreage limitation on the Federal exchange coal? Will there be any provision made for emergency exchange of fee coal within an alluvial valley floor when such an exchange is needed to meet the fee owner or lessee/operator's contractual commitments or other financial commitments? What role will the local and State governments play in the exchange program? Will the Department of Interior consult with other agencies such as the EPA, Department of Agriculture, etc. to determine if those agencies have any objections to the particular Federal coal tract to be exchanged for fee coal? These questions must be addressed in the final EIS in order to provide the Secretary of the Interior a complete picture of the impact of the proposed management program.

Peter Kiewit Sons' position is that exchange coal should not be included in reaching final production targets for Federal coal deposits or for tract ranking of Federal coal. The rationale is that the Federal exchange coal is replacing fee coal that would not be subject to production targets and ranking for Federal coal. On the other hand, any land containing Federal exchange coal should undergo the unsuitability review in order to ensure that the exchange coal will be mineable. Furthermore, the Department must adopt procedures for emergency exchanges of AVF coal when such an exchange is necessary to meet the fee owner or lessee/operator's contractual or other financial commitments.

II.

Another area of concern that we have is how the two tracts of coal, i.e. the fee coal within the alluvial valley floor and the Federal coal which is proposed for the exchange, will be appraised for economic value. Our specific questions are: What criteria will be used in determining the value of the fee coal and the Federal coal involved in the exchange? Will the BTU, sulfur, ash, moisture content, etc. and the

number of tons commercially mineable be the only factors? Will the strip-ratios of both the fee coal and the Federal exchange coal be considered? Will the existing lease arrangements between the fee owner and the operator/lessee be taken into account? Will the costs of acquiring lands adjacent to the AVF fee or leased Federal coal needed for siting of mine facilities be considered in determining the economic value of the AVF coal? Will the same consideration of adjacent land requirements be given to proposed Federal exchange coal? Will the cost of economic and environmental studies made by the fee owner and the operator/lessee be taken into account when determining the economic value of the alluvial valley floor coal? Will the proximity of the Federal coal to the operator/lessee's current operating facilities for other mines be taken into account? If the owner/lessee/operator has already expanded his existing facilities at an adjacent mine to handle the now-unmineable AVF coal, will this economic factor be included in determining the value of the AVF coal? Will surface damage agreements be included in the determination of the value of the alluvial valley floor coal and of the Federal exchange coal? Will the Federal coal that will be exchanged be coal that can be surface mined? If an exchange program is to be implemented, standard regulations concerning the minimum economic criteria to be used in determining economic value must be adopted. These economic criteria must be in the final EIS. Our position is that each of the above issues should be part of the minimum economic valuation criteria for the AVF coal and for the Federal exchange coal.

III.

A third problem area that we foresee concerns the extent to which fee coal will be subject to an exchange. For example, where the fee coal or currently leased Federal coal within an alluvial valley floor is part of a seam of fee or leased Federal coal which extends beyond the alluvial valley floor and that non-AVF fee or leased Federal coal would not be mineable unless the alluvial valley floor coal was included in the mining plan, will the fee owner or Federal coal lessee be able to include the non-alluvial valley floor coal in the exchange? What will the Department consider to be a logical mining unit in regards to alluvial valley floor coal? Would the alternative of underground mining of alluvial valley floor coal be considered in determining whether that coal is eligible for an exchange? To what depth will coal be considered for an exchange? In the case of fee ownership of minerals, including coal, within an alluvial valley floor, will an exchange program exchange all the minerals contained within the fee land or just the coal? Since these questions address the basic question of how much coal will be subject to the AVF exchange program and since the draft EIS does not address this issue, we think that the final EIS must address this issue in order to give the Secretary of the Interior a complete picture of the program. Peter Kiewit Sons' position is that when AVF coal is subject to an exchange, all the coal associated with the AVF coal in a logical mining unit should also be subject to the exchange.

IV.

A fourth area of concern that we have is the question of how the Federal coal that will be exchanged for alluvial valley floor fee coal would be selected. Will the fee owner be given the right to nominate areas of Federal coal that the fee owner is interested in? Will the Department grant an exploration permit to the fee owner to explore the proposed Federal exchange coal prior to the exchange? How would the Department of the Interior handle the situation where two fee owners or lessees of fee coal desire the same tract of Federal coal for exchange purposes? Would a mine operator with an existing mining operation adjacent to the proposed Federal exchange coal have the right to demand that that particular Federal coal tract be put up for bid rather than exchange? In the case of fee surface over the Federal exchange coal, who negotiates with the surface owner? Will surface damage payments be included in the valuation of the Federal exchange coal? This area of concern is getting back to the question proposed above as to how the exchange program fits into the overall concept of the Federal coal management policy and must be addressed in the final EIS. Peter Kiewit Sons' position is that the fee owner/operator/lessee should have the right to nominate areas of Federal coal for exchange purposes. Upon such nomination, the BLM should grant an exploration permit to the fee owner/operator/lessee in order that the value and suitability of the Federal coal be determined. Furthermore, the owner/operator of an active coal mine should have the right to require that the proposed Federal exchange coal be available for competitive bidding. Finally, preference should be given to Federal exchange coal under Federal surface and to Federal exchange coal under surface already owned by the fee owner or lessee who is proposing the exchange.

V.

We are also concerned about the possibility of exchanging rights to fee coal within an alluvial valley floor for the right to lease Federal coal. This possibility has been mentioned by Department officials as being an alternative to the exchange of legal title to fee coal for legal title to Federal coal. The question we have is that in the event that either fee coal or Federal coal lease within an alluvial valley floor is exchanged for the right to a Federal coal lease, what stipulations will be imposed upon that lease and what lease terms and royalty will be imposed? Our position is that the fee owner/lessee should be in the same economic position after exchanging his fee coal ownership/lease that he was in prior to the exchange.

VI.

A final concern is whether an owner of fee coal or the lessee of Federal coal within an alluvial valley floor must submit an application for a mining permit and have that application rejected before being allowed to participate in an exchange program. The specific questions

we have are: What kind of studies must be done prior to an exchange in order to show that the coal in question exists within an alluvial valley floor and is precluded from being mined as a result of its location? Who is responsible for such an alluvial valley floor study? If an application for a mining permit for coal within an alluvial valley floor is turned down by the regulatory authority on more than just alluvial valley floor considerations, will the coal still qualify for an exchange? In the case of a State regulatory authority, what role will that authority play in the exchange program? Will a site specific EIS be required for the Federal coal which will be exchanged? If so, who is responsible for carrying out such an EIS? Can fee or Federal coal in an alluvial valley floor in one State be exchanged for Federal coal in another State? Finally, can a single tract of AVF fee coal or leased Federal coal be exchanged for a number of tracts of Federal coal which cumulatively have a value equal to the alluvial valley floor coal? Similarly, can several tracts of AVF coal be exchanged for one tract of Federal exchange coal? We believe that a minimum amount of studies (and hence delay in time) should be required. The fee owner/operator/lessee should be able to go to the regulatory authority - whether State or Federal - present his studies and obtain certification that the coal in question is eligible for exchange. This would eliminate the need for submittal of a mining plan (with the requisite expenditure of time, money, and effort) in order to qualify for an exchange. The over-all need in an exchange program is flexibility within an over-all regulatory structure. The draft EIS on the Federal coal management program does not provide any basis for an exchange program, let alone a flexible program.

We would appreciate any efforts that the Department would make to clarify the above questions in the final EIS on the Federal Coal Management Program. We do think that all of these concerns need to be addressed in the final EIS in order to give the Secretary a complete picture of how the Department's proposed implementation of the congressional mandate cited above fits into the "preferred alternative" for the coal management program.

Thank you for your consideration of these comments.

Yours truly,

PETER KIEWIT SONS', INC.

Donald L. Sturm
Vice President

DLS-MWC/dg

February 12, 1979 **103**

To: Frank Gregg, Director Bureau of Land Management

From: James Cannon on Behalf of the Council on Economic Priorities

COMMENTS ON THE DRAFT ENVIRONMENTAL
STATEMENT: FEDERAL COAL
MANAGEMENT PROGRAM

The Department of Interior has been struggling since 1971 to unravel the complexities of the federal coal leasing program created by over half a century of maladministration of an inadequate and increasingly antiquated leasing mechanism. It has achieved a breakthrough of sorts in its Environmental Statement (ES) outlining a proposed new leasing program in that a government study finally examines--under one cover--most of the prerequisites for leasing in the public interest. Unfortunately Interior has made some false assumptions and has jumped to conclusions far outside those indicated from a rational examination of the data. The result is that its "preferred" leasing program will not achieve its stated objectives and its "Environmental Statement" does not satisfy the requirements of the National Environmental Policy Act.

Interior simply has picked the wrong program from the host of options available to it. In its zeal to escape the problems created by errors rampant in earlier leasing efforts, it has established a program primarily aimed at new leases, but this program will not permit the agency to jump off the treadmill on which it has been spinning non-productively for many years. The treadmill represents a "perpetual motion" machine created by circular, "closed loop" logic which runs as follows:

1. No new leasing program is permissible under NEPA until Interior can demonstrate a need for western coal from unleased land, but Interior can not prove a need because of incomplete and inaccurate data concerning the potential contribution of coal from existing leases.

2. The lack of data problem continues because Interior does not have a strong program to study coal reserves and production potential from existing leases or to regulate actions by present lessees.

3. Interior does not have a strong program to regulate existing leases because it is focusing most of its efforts

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toward the development of a program for new leasing and has few resources available to grapple with issues concerning existing leases.

4. A program for new leasing cannot be implemented until a clear need for coal from unleased land is established.

5. Return to #1 and repeat indefinitely.

This treadmill will continue to paralyze federal coal leasing as long as Interior is intent on development of a program for new leasing rather than a program which resolves the problems created by past leasing errors first. Through the many reforms in federal land use management practices instituted this decade, Interior now has most of the statutory authority it needs to implement sound leasing. It also has the talent. But its preferred leasing alternative is completely upside-down. It assumes that the problems of the past will be swept aside like deadwood or a pebble in a road in the face of a program for new leasing, when, in fact, those problems will continue to act as an insurmountable wall, growing in height, thwarting efforts to move on. This wall--the problems of the existing leases--must be dismantled piece-by-piece and the pieces rearranged to form the brickwork of the road to sound western resource management.

There is a second bit of "wishful thinking" on the part of the Department of Interior which undermines the rationale behind its preferred leasing alternative. One of the four "benefits" of the preferred strategy, according to the ES, is that "new leasing would...provide a means to promote a more desirable pattern of coal development." (p. 2-43). It is not necessarily true that the pre-lease land use planning, tract selection, lease sale, and post-lease regulation components of the preferred path will do anything to improve the development pattern resulting from activities on existing leases. Yet these actions will continue to dominate development patterns for years or decades to come. It takes different tools to claw oneself out of a hole than in does to climb a mountain. Interior ignores the reality of its present plight. It is at the bottom of a hole 59 years deep and not starting with a clean slate. Its preferred program--even if adequate for starting from scratch (it is not)--is not suitable for the present reality of western coal management.

The preferred program, by focusing on new leasing, presents a "packaged deal" to the american public. Interior has built a scenerio describing the impact of new leasing which is based on hypothetical results from the implementation of presently non-existing or untested leasing components. Ultimately the message of the ES is "trust us". This is unacceptable, especially for an agency

whose chief "calling card" for trust with respect to coal leasing is the incredible mismanagement it has exhibited in the past. Pressured by a mythical constraint that we must lease more coal land in the very near future, Interior is asking us to "test fly" the program without first testing the many individual parts which comprise it "on the ground" first. The existing leases provide the perfect testing ground for the components of the new leasing program and implementation there first, on a lease-by-lease, part-by-part basis could provide the experience we need to fine-tune the program before taking off on new leasing.

Interior eschews the opportunity to implement components of its leasing program on existing lease first, however, preferring the more grandiose, but foolhardy approach instead. This strategy converts the existing leases from a testing ground to an unstable foundation for the new leasing program. Interior's preferred path, therefore, is like building a house on sand--the sand representing the existing leases. No matter how strong the house, it threatens to be blown away by the first storm. There certainly have been many stormy issues emanating from the existing leases, enough, one would think, to have convinced Interior of the impracticality of sweeping the old leases "under a rug".

Having exhausted the repertoire of mixed metaphors to describe the general weaknesses in the philosophy behind the proposed Federal Coal Management Program, the remainder of this report will discuss in more detail some of the specific inadequacies of the ES and shortcomings in the preferred alternative.

THE ES DOES NOT DEMONSTRATE A NEED FOR ADDITIONAL LEASING

The need issue is the heart of the Environmental Statement, yet it fails to convincingly demonstrate that a coal supply shortage will develop unless more federal land is transfered into the private sector.

Interior's own analysis belies the argument that additional leasing is necessary during the next five to eight years. The conclusion of the ES concerning need is that "For 1985, there appears to be little need for new leasing, except in one region, the Green River-Hams Fork Coal Region. For 1990, there could be some, but probably not a large, need for new leasing to reach the low projected production levels." (p. 2-47) Several pages earlier the report reads "All told, actual production of coal appears likely to occur 4 to 7 years after the sale is held and a lease is issued." (p. 2-43) Why then should additional leases be issued before 1983 at the earliest--seven years before demand might start to outstrip supply? The time between now and 1983 could be primarily devoted to implementing components of the leasing program on existing leases and gathering more information to justify the scope of additional leasing needs if any.

Unfortunately the need issue can not be discarded so quickly, however, not because Interior has another more compelling argument, but because the data used in its analysis is not strong enough to permit concrete conclusions about western coal supply and demand. This inadequacy makes the ES unacceptable under provisions of the National Environmental Policy Act. The ES could be made acceptable only if the preferred path itself was designed to provide the information required to make informed judgements about leasing needs. This process admittedly could take several years, but--based on the best available data--this should cause no hardship.

The supply component of Interior's need analysis deals mainly with estimating coal production from existing leases. Currently approved or pending mining plans call for an output in 1985 of 308.6 million tons. Several uncertainties cloud the sharpness of this prediction. Before approval of the submitted mining plans, for example, Interior proposes to apply its "unsuitability criteria". These criteria, authorized by Section 522 of the Surface Mining Control and Reclamation Act, could place some coal included in mining plans off-limits or they could operate with the opposite impact.

The problem with the unsuitability criteria--in relation to the need question--is that we just don't know what its impact will be on existing leases. A test application of one set of proposed criteria last summer found that 65% of the coal land in the study area in Utah would be placed off-limits to mining by just one of the 21 standards. The criteria have been diluted and changed since then and current proposals are thought to effect only 5-10% of federal land.

How much and which land will be affected is not known because the criteria have not been finalized and have not been tested in the field. Interior is in a bind, on this point. It cannot finalize the unsuitability criteria before the ES is approved because that would be an act taken under a new leasing program, but it cannot justify a preferred path calling for new leasing without them.

Unproposed and untested regulations defining "maximum economic recovery" of coal could also affect coal supply from pending projects. These regulations, authorized by Section 3 of the Federal Coal Leasing Amendments Act, might induce an expansion in output from levels proposed in mining plans if they call for the maximum yield from each seam. The ES mentions that "The Secretary prefers that MER be calculated in in a way that all coal seams which are collectively profitable must be mined, taking into consideration social and environmental costs," (p. 3-41) Until MER regulations are put into concrete terms and applied, it is impossible to predict coal output from pending mining plans from this one vague statement.

The "areas of critical environmental concern" designations authorized by Title 2 of the Federal Lands Policy and Management Act of 1976 provide another example of a new land management program which could affect production of proposed mining operations. Again it is too early to assess their impact because the designations have not yet been made. The same argument applies to unannounced criteria defining "alluvial floors" which will protected from mining.

Similar and new problems are discovered when examining Interior's "likely" production potentials from the 311 existing leases for which no mining plans have been submitted and the 172 pending preference right lease applications. The ES states that by 1985, 57.3 million tons will be produced from the former category (p. 2-33) while the PRLA's have a production potential of 251 million tons annually (p. 2-36).

These projections are unsupportable for the same reasons cited for leases with mining plans pending--the impact of new regulations is unknown. Under the preferred path, Interior is not even planning on assessing the impact of the regulations when they are promulgated, but instead will wait until the lessee submits a mining plan. To wit: "In the case of non-producing leases, the Department 's preference is to apply unsuitability criteria to the area of the leasehold at the time that the lessee submits a mining plan." (p. 3-39) The criteria will be applied before preference right lease applications are processed, but this is still too late to benefit the ES analysis.

A further problem with assigning production potential values to leases without mining plans and to PLRAs is the quality of the data backing up the conclusions. The "more likely than not" judgements concerning contributions from existing leases "were made in March 1978 by GS mining supervisors, taking into account demand for the coal type, environmental problems of the lease site, transportation availability, mining costs, lease size and other factors." (p. 2-30) Nowhere in the ES is the study methodology behind this seemingly comprehensive assessment explained. Given the "passive" stance of Interior toward existing leases prior to submittal of the mining plan, it is hard to envision GS sneaking such a thorough review past government budget watchers, or the public interested in leasing issues. The ES should contain a complete description of the study approach, time schedule, and budget before asking that the validity of its conclusions be accepted.

Perhaps this bit of skepticism is unwarranted, but the track record of Interior in collecting complete and accurate data concerning coal deposits on existing leases is unimpressive. The General Accounting Office has been a frequent critic of Interior's data gathering. A July 11, 1978 GAO report discovered that reserve figures for federally leased coal land obtained by the GS for 21 of 219 leases examined were more than double the estimates put forth by lessees. Departmental estimates were lower than those of lessees

on another 50 leases and the total difference here amounted to nearly 1 billion tons. The GAO urged Interior to expand its data-gathering capabilities, but there is little reason to expect that many changes were made before the ES was completed. (The GAO report, in fact, was actually published after the completion of the GS survey).

The Department of Interior has established an "automatic data system" which it claims stores a wealth of information about each lease. A review of a partial print-out from this computerized system in September 1978 revealed a large gaps in the data base and a persistant reporting of outdated statistics from a five year old--and highly discredited--GS fact finding venture.

The methodology behind the assessment of coal production from pending PRLAs is even more vague--and suspect--than that for existing leases, yet the ES provides no explanation of figures on Table 2-23 (entitled Production Potential from Outstanding Preference Right Lease Applications) besides a footnote to the title which reads in full "cannot be disclosed because of confidentiality requirements." (p. 2-36)

It is unclear from the ES how Interior factored potential production from leases which will probably be issued under the currently operative "short term leasing program" approved in a consent decree temporarily settling the NRDC vs Hughes lawsuit. About 35 leases could be issued under this program which could provide between 13 and 17 million tons a year production by 1985. Treatment of these leases should be more clearly explained in the ES.

Examination of the two summary tables on federal coal supply for 1985 and 1990 without new leasing (Tables 2-29, 2-30) is eyeopening. The total planned production from existing leases with mining plans in 1985 is 364.9 million tons. This total is expected to drop by 1990 to 362.0 million tons. There is no explanation for this surprising decrease. The footnote to the numbers for 1990 reads "figures obtained from Table 2-19", but table 2-19 is entitled "Recoverable Coal Reserves in Existing Federal Leases" (p. 2-31) and contains no data which would allow a prediction of production in 1990.

The coal supply tables call for 57.3 million tons from leases for which no mining plans have been submitted both in 1985 and 1990. This assumes that all leases which will go into production will do so--at full capacity--by 1985. Diligence production requirements for these leases require only that production be initiated by June 1, 1986--not full production by 1985--and five year extensions are permissible under certain circumstances. It seems unlikely that production from this category will not change between 1985 and 1990.

The table of 1990 coal supply contains a column for production from pending preference right lease applications. There is no explanation how the total of 90.5 million tons was reached except for a footnote which reads "figures obtained from Table 2-20." Table 2-20 is entitled "Planned 1985 Production from Approved and Pending Mining Plans Containing Federal Leases" (p. 2-32) and seems to bear no relation to PRLAs.

The coal "demand" side of Interior's analysis in the ES is nearly as disturbing as the supply side. Its derivation is work performed, not by Interior, but by a newly formed task force within the Department of Energy. This is the first try at coal forecasting from federal land by DOE and it seems unwise to place too many eggs into this basket until its sibylline powers are confirmed. Also, much can be lost in the translation between DOE and Interior, but the Leasing Liaison Committee of four officials from each agency was formed only a few months ago and has not established a proven trackrecord of accurate and open communicativeness.

THE ES DOES NOT EXPLAIN THE NATIONAL IMPACT OF EXPANDING WESTERN COAL SUPPLIES THROUGH THE PREFERRED PATH

There is a puzzling sentence in the ES which reads "The principal consequences of leasing less federal coal than is needed to meet national energy objectives would likely be to alter patterns of coal development, both at the national and regional levels. At least on the basis of of computer projections, it appears improbable that total national coal production would be greatly reduced." (p. 2-47)

If Interior does not lease to meet the national objective of increasing coal production (it claims it will have little impact), then what other national energy objective from the list on page 1-27 does it help meet? It certainly will do little to foster energy conversation--the first goal on the list--and it will do even less to promote the building insulation program (#5) or solar energy (#6). In fact, it seems that a new coal program could actually serve to undermine these national energy objectives by "creating" a demand for coal which could compete to the detriment of conservation, insulation, or solar energy goals. The ES should examine this question thoroughly.

Interior explains that a new leasing program will promote a more rational development pattern in the West, but it admits that this is guesswork. Furthermore, it concedes that leasing decisions will affect interregional shifts in coal development patterns--presumably by altering production in the eastern or midwestern coal fields--and that end-use considerations could

cause unknown impacts. The ES steers clear of most of these interregional issues, however. Concerning end-use considerations, for example, the ES states "The Secretary preferred not to adopt end-use stipulations pending a Solicitor's opinion on the Department's authority for such action." (p. 3-42)

THE PREFERRED PATH WILL NOT MINIMIZE DEVELOPMENT IMPACTS OR PROMOTE MORE SOUND DEVELOPMENT PATTERNS

With its emphasis on new leasing, Interior will be forced to turn its back on efforts to minimize adverse impacts from activities by existing lessees. The focus of the proposed land use planning system is directed toward selecting land not currently under lease, ranking this land, and leasing it in the future. Little emphasis is placed on developing a system to manipulate development on land currently under lease in such a way as to maximize actions in the public interest. The existing leases represent a horse out of the barn and special attention must be placed on these leases to prevent abuses typical of the past from continuing.

The major focus of the new program should be to investigate the government's obligations toward present lessees and its powers to regulate their actions. Full use of present and newly acquired powers to control lease assignment activity, lease exchanges, condemnation, minimum production, due diligence, and so on for existing leases should be the prime objective of the new leasing program.

Interior would respond, surely, that it does intend to be heavily involved with administrating existing leases. It seems unlikely, however, that it will be able to pursue existing lessees and develop a program to issue new leases simultaneously with equal fervor. The former are creating real and avoidable impacts today and impacts from the latter will only occur if new leases are granted. Obviously, the way to protect the West and the public interest is to solve present problems first before risking the creation of new ones.

The perils of the proposed path can be seen by example. Historically, leases have been issued without concern for the environment, for minimal payments, and charge only trivial royalty fees. Interior has the opportunity to correct or adjust lease term provisions at 20 year intervals. Between 1971 and October 1978, a backlog of 84 leases whose lease terms were overdue for adjustment had accumulated. This backlog was the result of Interior's preoccupation with the development of leasing reforms. In 1977 alone, the government lost over $4 million in royalties from production on leases overdue for adjustment which were permitted to operate under the old royalty structures. New rates will be approximately $1.00 per ton higher.

When Interior finally began processing these leases for adjustment, two lessees appealed to the Land Hearing Board saying that Interior had missed its chance to alter lease provisions through the delay. If these appeals are upheld, the public will lose millions of dollars in royalties over the next twenty year period for each producing lease.

A similar inattention to the administration of existing leases marks Interior's attitude toward overseeing lease assignments and through various other examples of its "passive approach" to existing leases cited earlier. Over one quarter of all federal leases changed hands through the assignment market between 1973 and the end of 1977, yet Interior never investigated the competitive implications of any of these transactions or studied its powers to influence lease assignments. The assignment provision represents a major obstacle to resource use planning in the West by creating a constantly changing set of lessees and an enticement for land speculators. Yet Interior has found no time to deal with this issue.

Interior's disinterest in existing leases is countered by its enthusiasm to launch its lease tract selection program for new leasing. This new process will rely heavily on the present "management framework planning" process which is still in its infancy. Most MFP's are presently sadly deficient or contain outdated or inaccurate data. If Interior plans to lease in the next several years, these plans will, by necessity, provide most of the guidance available to the agency. The preferred path, therefore, if it includes leasing in the next few years, not only will not minimize adverse impacts from existing leases, but will not minimize the chances for adverse consequences from new leasing, either.

Finally, the planning process itself appears too weak to adequately protect the environment or existing populations and industries. No consideration is given in the ES, for example, of the impact of western energy development on water supplies. The proposed suitability criteria contain a great many exemptions which could permit adverse impacts. The data supporting the reclamation potential discussion in the ES seems overly optimistic. Regulations covering a host of potential impacts are not in place or even proposed, making their future uncertain. A great deal of discretion lies with the local BLM mining supervisors who might exhibit uneven performances when enforcing new planning programs. The socio-economic impact data contains a lot of sheer guesswork.

There is always a great deal of uncertainty involved in embarking on a new venture. All risk can never be eliminated or all impacts completely mitigated. The object is to move only with confidence that you are putting your best foot forward. The preferred path proposes to move forward far too quickly, with too big of a step,

in the wrong direction. Interior would be well advised to reshape its leasing proposal to incrementally adopt leasing reforms on existing leases first in order to minimize adverse impacts, to build a strong program, and to establish a convincing need before undertaking new leasing. By not aiming every future action toward undoing a mistake made in the past, by not testing the limits of its authority over existing leases to the utmost, by not testing new regulatory equipment in a stepwise fashion, Interior will continue to be vulnerable to prolonged legal challenges and further delays from the actions of dissatisfied environmental, citizen, and industry groups alike.



Tri-County Ranchers Association

Birney, Montana 59012

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Sincerely yours,

Ed Malenovsky, Vice President
Tri-County Ranchers Association

I. Planning Process

As we have stated earlier we have serious misgivings regarding the use of the Bureau of Land Management's old management Framework Plans. These outdated plans have left out vital information (Decker-Birney, from draft to summary has omitted an important drainage) and have acknowledged lack of sufficient information (Decker-Birney April 1974, p.75, p.76, p.81). These MFPs reflect the previous administration's policies toward coal development and management. They were inadequate then and they are still inadequate. It is our opinion that in order to attain the goals put forth in the Management Program, entirely new and complete assessments are in order. Dressing up the old MFPs with new covers and supplements will not suffice.

II. Assessment of Existing Leases

TCRA still maintains that it is improper to consider the granting of new leases without having full data on the amount of coal available in existing leases. Neglecting to assess how much coal is actually available for development from the existing leases makes it impossible for the Department of the Interior to know how much new coal is necessary to offer to meet the Department of Energy's projections. TCRA here offers a suggestion for managing existing leases:

1. go to all lease holders and determine the level of interest
2. if industry is interested (as indicated by financing and a potential market) call on the Office of Surface Mining to make preliminary environmental assessments of the tracts
3. If Coal (and other appropriate agencies) see possibilities for development then factor that amount of coal into total production quotas

It is as important to consult in this way with lease holders as it is to consult with surface owners over potential leases.

III. Need

We think that there is undue emphasis on western federal coal in this management program. It is easy to understand this emphasis since DOI has absolute control over this federal resource. However, if other federal, state and other accurate data to deter the ever-rising free crop yields to manufactured goods. DOI can certainly gather coal production data and potential production data from private coal in the east and factor that data into national production goals. We interpret the title, Federal Coal Management Program, to mean the consideration and management of all coal resources in the United States rather than meaning management only of federal coal. We think that this would be the only equitable way to treat the national energy picture.

IV. Thresholds of Development

The concept of thresholds of development is basically good. However, as outlined in Chapter 3, page 21, the concept is not specific enough to be meaningful. TCRA believes that there should be specific guidelines for determining acceptable thresholds of development in two principle areas of concern.

The first area of concern entails cumulative impacts on existing communities. For example, we of this rural community are observing the cumulative effects of developments in Montana on our trade and medical center which is Sheridan, Wyoming. These effects range from minor nuisances such as no parking space to major problems such as pollution of our waterways and overcrowding of our transportation, medical and school systems. When considering leasing, the DOI should recognize that established communities will unavoidably bear the brunt of development. In establishing thresholds the DOI must consider the point at which facilities and services can no longer accommodate expansion in a responsible manner.

Our second concern regards leasing in remote and undeveloped areas. These areas currently provide no services or facilities able to accommodate any substantial population increase. The acceptable threshold for such an area would obviously be very low.

We think there should be specific guidelines for threshold levels applied both on a cumulative basis and on a site specific basis. The potential of exceeding a threshold should be factored into the criteria for determining unsuitability.

The section on thresholds frequently refers to land use plans and planners. These are not defined clearly. By "land use plan" does the DOI mean the existing MFPs? By "planners" does the DOI mean local BLM officials or locally appointed planners? The DOI should specify just who does the planning regarding thresholds.

VI. Surface Owner Consent

We have previously stated our views concerning surface owner consent in regard to the unsuitability criteria. We wish to reiterate; the consent of the surface owner must be the DOI's sole responsibility (regarding the attainment of consent). Consent must be the first criterion for determining suitability for leasing. To allow (and therefore to condone) industry this opportunity to continue the harassment of individuals regarding their rights is unacceptable. Besides, leaving the acquisition of consent up to industry raises no question that DOI can assure genuine competition in the leasing process. The surface owner will have given his consent to one company. Therefore, that company will be the only one to bid after DOI should acquire the consent of the owner and not that of up for bid...thus insuring a measure of competition and a fair payment for the public's resource.

VII. Reclamation

The DEIS states that one of its goals [illegible] program is about the [illegible] land reclamation. In that part which the former never [illegible] and afterward be [illegible].

We [illegible] to see what the alternatives to make what reclamation is possible to "even better" than it was pre-mine. The means for this [illegible] appears to be one study, that made by Palmer in the Decker area.

There we [illegible] the problem of [illegible] the water heavily saline to [illegible] water [illegible] are not addressed in all. The quality and quantity of ground water are of primary concern to us as it is the main source of drinking water for both livestock and humans. In the Decker-Birney planning unit most streams and reservoirs from [illegible] and Otter Creek flow down to the Tongue [illegible] are fed by ground water sources. Any losses will unavoidably affect downstream people's water supply.

Studies done at Colstrip in 1976 by the Montana Agricultural Experiment Station with grazing on reclaimed land and native range clearly showed that not only did cattle fail to survive on reclamation, they actually lost weight. It is true, the studies did not address the reasons for this, whether it was lower nutritional value of the forage or trace minerals necessary for growth on the reclamation. Nevertheless, the results are self explanatory. We, ourselves, have misgivings about the efficacy of reclamation.

Another major concern of ours is the unsolved issue of the spoils as it affects the forage grown on them. We are worried that there are strong possibilities for toxic results for livestock. No matter how lush and beautiful a "reclaimed" area may appear in comparison to native range, if livestock stand a chance to be poisoned or to lose weight by eating forage grown on spoils, or, if the meat is potentially harmful to humans who might consume it, it is worthless. We base our concerns on the studies that have been done in the region of copper-molybdenum imbalance problems.

TCRA believes that reclamation is one area where the "innocent until proven guilt, premise" cannot apply. Where land, its productivity, water and future generations are at stake the questions must be answered prior to leasing and/or mining. To date they have not been answered anywhere in this region to the satisfaction of people in agriculture.

VIII. Lands Unsuitability Criteria

The lands unsuitability criteria must be applied to all areas which have a potential for coal mining. Adding an exception to each criterion makes it almost impossible to determine that any land is unsuitable. Exceptions should be tightened. We question whether an exception is necessary for each criterion. Little or no discretion should be left to the local BLM. Socio-economic, cumulative and off-site impacts must be included in the EIS.

*Report #115 "Plant Response & Forage Quality for Controlled Grazing on Coal Mine Spoils", published Aug. 1977 Montana Ag. Experiment Station

Office of Coal Management (140)
Bureau of Land Management
18th and C Streets, N.W.
Washington, D. C. 20240



ART HAYES, JR.
R BAR RANCH
BIRNEY, MONTANA 59012

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Feb. 9, 1979

Gentlemen:

We would like to submit some comments to the Department of the Interior regarding their Draft Environmental Statement, Federal Coal Management Program. We appreciate the opportunity to do so. Our belief is that this Administration will give conscientious consideration to our complaints and suggestions.

It is of serious concern to us that the DOI intends to use the old Management Framework Plans done by the local Bureau of Land Management Office as base for their leasing plans. These MFP resource studies ostensibly were done to provide for a multiple use approach to federally administered resources. Actually one resource, coal, provided the only real impetus for putting together these plans (the summary does acknowledge "the renewed interest for coal" as the factor prompting the study) and the MFPs lean heavily toward the development of coal. Regardless of what has been proclaimed--the MFPs were not well done, comprehensive studies. Local public participation consisted of making comments rather than making local decisions. The MFPs were written even though there was an acknowledged lack of information and data in almost all sections. There were omissions, especially regarding water. In the Decker-Birney study, Hanging Woman Creek was omitted as an important drainage and ground water is hardly mentioned. Treatment of the socioeconomic problems were superficial. The effects of strip mining on the agricultural industry was largely ignored. Enclosed is a copy of a letter written by Dr. Raymond L. Gold and printed in the SHERIDAN PRESS on October 18, 1976. His letter is a better expression of the complaints and frustrations which we have in regards to the MFP process.

With the scrapping of the EMARS program we thought we had seen the last of these poorly done studies. However, in 1978 the local BLM office published Technical Examination and Environmental Assessment documents. They concerned coal lease applications for near Decker and near Colstrip, Montana. These TEAAs were even worse than the MFPs--certainly not better. The poor handling and content of the Decker TEAA prompted a letter of complaint to the DOI in July of last year. (letter to Guy Martin from Tri-County Ranchers Association, July 24, 1978)

The above complaints regarding the MFPs and the TEAAs are meant to illustrate and emphasize our position regarding the use

p.2

of the EIS as a guide for renewed leasing. We firmly believe that new, comprehensive studies should be done and those going into studies should be given new directives and tight guidelines. Speculation should not be left up to the local BLM officials--- or anyone else for that matter.

Besides the use of the EIS we have other problems with the preferred coal management program.

The alternative proposals were not given much consideration or study compared to the preferred one. The alternatives must be thorough and realistic in order to be actually considered as possibilities.

The procedures for acquiring surface owner consent do not reflect the intention of the law. At the hearing in Billings, Mont. on Jan. 24, 1979, the reason was put forth that waiting until nearly the end of the planning process to obtain surface owner consent would be an advantage to the surface owner in the event that he could change his mind. This is ridiculous. The real beneficiator of such a procedure and of the convenience it affords them is the BLM. The Department would be ready and waiting with its plans in the event that the landowner could be persuaded to lease. (There is nothing like the intimidation of continuous planning to make one believe that "mining is inevitable".) Throughout the last years those landowners who wished to lease have done so and those who wish to continue managing their own property don't need the EIS to aid industry on them. Industry has incentive enough to continue their harassment. It must be the BLM's responsibility to obtain surface owner consent before the planning is done.

The draft management program (and the unsuitability criteria) seem to assume that reclamation is always possible. This has not been shown to be so. Also, there are serious questions regarding the restoration of ground water.

We are tired of studies done to justify a foregone conclusion. (The Fort Union and the Texas) We are tired of good land and good regulations being weakened and changed because they are "too good" and therefore restrict anticipated actions. (The unsuitability criteria with its weakening proclivions and distortions...and the surface owner consent provision that is not as vigorous intended) We realize that the EIS's intentions are pending in its attempt to be correct the procedures and directions of the previous administration's department. It is important that (since the release of the draft environmental impact statement) these intentions do not fall short enough for the sake of expediency.

Sincerely,

Mr. Art Harper Jr.

Art Harper

Mr. Art Harper Jr.

Billings Gazette - Oct. 18, 1976

Your opinion

Report said to contain errors

by Raymond L. Gold
Director
Montana Social Research Bureau
Billings, Mont.

At the outset, the report refers to the "Social Research Study" when, in fact, it is a social impact study. We each did our own study of the region, Jobes concentrating on surveying 14, while I focused on determining the impact of energy development. The report repeats this error of reference in a footnote in the section on Environmental Enhancement and Protection.

Not only does BLM misconstrue a finding on general acceptance of energy development in the region but also makes the same error explicitly in a paper (attached to the report) titled "Application of Public Opinion and Attitudes Data." The BLM erroneously

"According to the Gold Sociological Study, there are certain areas within the region where there is a high level of 'General Acceptance' and others with 'General Opposition' to coal development. As documentation, Jobes and Gold (1976) are cited."

Jobes and I have discussed this statement given the impression that there is substantial acceptance of energy development in the region. In fact, the opposite is true. Our study clearly shows that only one area (consisting of just several families) in the entire region is generally accepting of energy development whereas the remaining five show various degrees of opposition. Jobes has made this point in his forthcoming article (Figure 6) on my study. He has also made it in a letter to the BLM regarding the misleading statement. Despite this, the BLM report continues to misrepresent my findings on general acceptance of energy development in the region.

The BLM report also misrepresents the findings of the Jobes study. Jobes found that the most frequently mentioned problem associated with energy development in the region was the impact on agriculture. The BLM report, however, mistakenly claims that "Jobes found that the most frequently mentioned problem was the impact on agriculture." Jobes found no such thing. Rather, he found that the most frequently mentioned problem was the impact on agriculture in southeastern Montana. This error is significant because it misleads the reader into believing that the impact on agriculture is the most frequently mentioned problem throughout the region. Jobes found that the most frequently mentioned problem in the region as a whole was the impact on social (or other historical) data which is more than five hours old.

All this is bad enough, but the BLM report contains numerous other errors as well. The most serious errors in the use of Jobes' findings as well as mine. Perhaps one of all is BLM's apparent lack of knowledge of the contents of any of these and the above-noted mistakes are, at least correcting attempts by public way. Central Washington office of BLM (Billings Gazette, October 5, 1976) to Montana's preliminary proposals for the agency's preferred boundary for the hauling and other land management requirements seem to be little more than a rubber stamp of the BLM's original proposals. The statement in capital letters that both Western and national energy needs dictate that the region's coal resources be developed as rapidly as possible" (words capitalized by BLM). It is certainly appropriate that the BLM report on lease selection decisions cannot, or should not, give great weight to what locals consider to be the effects of such decisions on their future quality of living, where and how they wish to live. The statement in capital letters attempts to put

County, Wyo., a national sacrifice area. Even optimistic industry projections are lower than the ones on this table.

RUSH TO IMPLEMENT PREFERRED PROGRAM

The DES states that "the key activity added to the land use planning process in the preferred program is the application of lands unsuitability criteria." However, the lands unsuitability criteria are now being applied to select federal coal lands (announced in the Dec. 8, 1978 Federal Register) as part of "special start-up considerations." The idea of initiating a major cornerstone of the DES preferred alternative before the public has an opportunity to comment on the DES appears to violate the National Environmental Policy Act and is also probably a violation of the NRDC vs. Hughes injunction. In addition, the application of unsuitability criteria prior to public involvement in their development probably violates the Federal Land Policy and Management Act public participation provisions.

Interior seems so convinced that its preferred alternative will be approved and that the unsuitability criteria won't be changed that it is ignoring public input and proceeding with both. The sole reason for this rush appears to be the politically-motivated decision to issue leases by mid-1980.

Another problem with the premature application of unsuitability criteria is that they will be applied to old existing management framework plans that were written for old EMARS industry-nominated coal lease tracts. One of the most laudable parts of the preferred program is that it attempts to look at all coal lands and weigh coal development with other land use values in a new planning process. This approach is undercut when old EMARS tracts and old coal-dominated MFPs are relied on for the first round of leasing.

Another problem with the hasty implementation of the preferred alternative is that vital components -- the Forest Service and Bureau of Land Management land use planning processes -- still aren't in final form. It is hard to put faith in a process that is in flux. The Sierra Club will be sending in separate comments on the proposed land use planning processes.

Ideally, to implement the preferred alternative, Interior should start with a clean slate. The new land use planning process should be put in place, the unsuitability criteria should be subject to full public review and then adopted, more complete data that is not coal resource dominated should be gathered for new MFPs, and then coal leasing proposals should be run through the preferred alternative flow chart.

LANDS UNSUITABILITY CRITERIA

The proposal to come up with a list of lands unsuitability criteria -- some based in law and some based on administrative good sense -- and applying them at the earliest stages of the land use planning process is commendable. I trust that this effort is being coordinated with similar efforts by the Office of Surface Mining.

Basically I am pleased with the criteria, but dismayed with the loosely written exceptions that in many cases negate the criteria. I realize the need for some flexibility to take into account local environmental conditions, but as proposed the exceptions are too flexible to guarantee meaningful protection.

Exceptions should be granted only when there is sufficient evidence to prove that the environment can be protected as adequately with leasing as it would be if no leasing occurred. Exceptions should be uniformly applied and not subject to industry pressure.

I was disturbed to read in the December 8 Federal Register that the criteria were field tested to determine "how much land and how much coal would be excluded from development by each criterion." I hope the field testers also looked at how adequate the criteria were to achieve the desired environmental protection goals. For instance, I'm curious about the origin of the ½ mile buffer around active eagle nests. Is there a biological basis for this size buffer or was it set after field tests showed that too much land and too much coal would be excluded if a larger, more adequate buffer was chosen?

It is unclear to me who will apply the criteria and grant the exceptions. An area manager? A district manager? A state director? It seems to me that local managers could apply the criteria as part of their land use planning function. But recommendations for exceptions should be sent to the national director who should be the central authority capable of granting exceptions. This would assure consistency in application of the criteria exceptions and would help guarantee that exceptions don't become the rule.

Rights-of-Way and Easements. The exceptions, especially number 5, appear to erase the criterion.

Wilderness Study Areas. The Wilderness Act (Section 4(d)3) allows for discretionary leasing and mining, but clearly coal mining would be incompatible with protection of wilderness values. Why not delay consideration of approval of noncompetitive coal leases and mining on leases until Congress decides if the area should be designated wilderness? If BLM doesn't intend to use the exceptions, they should be dropped.

Scenic Areas. The exception erases the criterion. This is an example of a catagory where a district manager under heavy local

pressure might apply the exception freely. Someone not subject to local pressure should make the subjective decision on a mine's impact on scenic values.

Lands Used for Scientific Studies. Both conditions, not one or the other, should be met before an exception is granted.

Natural Areas. It's hard to believe that coal mining could enhance information recovery. Any dragline would probably destroy more than it could ever uncover intact.

Endangered Species. The U.S. Fish and Wildlife Service and the state wildlife agency should concur in the granting of an exception. Mere consultation does not guarantee concensus.

Eagle and Falcon Nests and Roosts. Is there any scientific basis for the size of buffer areas and the anticipated success of nest relocations? These areas should just be avoided.

Migratory Birds. Again, wildlife agency concurrence, not just consultation, is essential.

State Resident Fish and Wildlife. Why is deer, antelope, and elk winter range protected, but not moose winter range? Why only elk migration corridors? The state wildlife agency should concur -- the federal override in exception number 2 is outrageous.

Wetlands. Exception number 2 is too subjective to be useful.

Floodplains. Exception number 1 is meaningless. There is always an alternative to leasing a floodplain -- leasing outside the floodplain or just not leasing.

Municipal Watersheds. These areas should be off limits to leasing. Why tempt the city fathers to sell out their water supply to appease local industry?

National Resource Waters. Why should the agency be allowed to decide if protecting a national resource water is necessary? This is another area that should be off limits.

State Lands Unsuitable. An excellent criterion, but there is no need for the exception since the criterion is already flexible. State concurrence, rather than consultation, should again be required.

State Proposed Criteria. The grandfathering in exception number 1 should be dropped.

Alluvial Valley Floors. There is no need for the exception since the criterion cites the definition and standards of SMCRA. If an

exception is spelled out it should also cite the prohibition on disturbance of the hydrologic integrity.

It might also be advisable to include unsuitability criteria on toxic substances, cumulative impacts of mines, and socio-economic threshold.

In summary, there is such an abundance of federal, state and private coal lands that it seems folly not to offer tighter protection for our most sensitive lands.

ALTERNATIVES OVERLOOKED

The DES offers a poor range of alternatives. The only alternative that is seriously considered and examined in detail is the preferred alternative.

The alternatives mentioned include different ways to set leasing levels, but different ways to run a coal management program are never examined.

The DES should examine when to apply the unsuitability criteria, alternative unsuitability criteria, alternative demand models, alternatives to relying on the land use planning of the agencies, alternative places in the decision making process to allow surface owner veto power, and alternative ways to rank lease tracts. Some of these alternatives are discussed in the option papers cited on 3-28. Unfortunately these decisions, like the decision to adopt the preferred alternative, were made long before the public had an opportunityto review of DES.

I think Interior should also examine combining parts of several alternatives. For example, one could construct an alternative that called for a continuation of leasing under the short-term criteria while the new land use planning processes are put in place and basic data is gathered to aide in preparation of new MFPs, unit plans and unsuitability criteria application. Then, once the pieces of the program are in place the preferred alternative could be initiated. This approach would buy time to produce more accurate need projections and leasing levels and eliminate the need to rely on old inadequate MFPs. Such an alternative would keep existing mines going, allow the opening of new mines, meet national needs and assure that the first round of new leasing is done right.

OTHER ISSUES

The DES talks about the need to review outstanding leases but doesn't integrate such a review into the preferred alternative. There need to be assurances of an aggressive review of all undeveloped leases and PRLA's and cancellation where existing leases are incompatible with new acceptability standards.

(7)

The DES cites the need to recognize threshold development levels (3-21) and suggests that such a discussion could take place at the land use planning stage. This is an extremely important concept and should not be left to the discretion of local land managers. A determination of threshold levels and a commitment not to exceed them should be made a mandatory part of the decision making process of the chosen alternative. State and local government should play a key role in the determination of acceptable thresholds.

There needs to be a better recognition of the interrelationship between tribal lands and the federal coal program. The rate and type of development around reservations will have long lasting social, economic and environmental impacts. There needs to be more opportunity for tribal coordination.

I don't think a more detailed discussion of alternative energy sources is needed in this DES, but any chosen coal management program needs to include a high degree of flexibility in its demand projections to account for energy source shifts. A glut of Alaskan oil, the introduction of Mexican gas and oil, a more rapid shift to solar power or a ban on nuclear power plants could drastically shift coal demands. No one denies that coal will play a major role in bridging the gap to a renewable energy economy. But coal is one of our dirtiest options and it is usually the first to be dropped when a more attractive alternative is available.

In conclusion, I want to congratulate Interior on the job it has done and the openness of the process that was used in the preparation of this DES. There are serious flaws in the program, but it is a major improvement in managing our public resources.

THE NEW MEXICO NATURAL HISTORY INSTITUTE
A Nonprofit Corporation
Box 369, St. Johns College
Santa Fe, New Mexico 87501

11 February 1979

Office of Coal Management (140)
Bureau of Land Management
Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

109

Sirs:

We comment on a limited but vital part of the Draft Environmental Statement on the Federal Coal Management Program: the effects of coal mining on preservation of fossils and of natural areas. As the Statement recognizes, these effects will come directly through disturbance of the land and indirectly through changes in water and air quality.

We heartily favor a central tenet of the preferred program: agency land-use planning should govern which areas are judged suitable for coal production.

We are less fully satisfied with the suitability criteria presented in Chapters 3 and 5.

(1) There is no categorical recognition of the Areas of Critical Environmental Concern (ACEC) established by the Federal Land Policy and Management Act of 1976 and covered in proposed planning regulations (43 CFR Subpart 1601). ACEC should, we think, be stated to be automatically excluded from leasing. No doubt areas that will be designated ACEC are covered under other headings; but it seems worthwhile to write the Coal Program in the law's terms.

(2) Although natural-area designation is listed as an unsuitability criterion, there seems to be no commitment in this Statement or elsewhere to the designation of natural areas for preservation of "typical" (as well as rare) natural ecosystems. The Bureau, unlike the Forest Service and National Park Service, has not recognized even in principle the need to make adequate reservations of land for this purpose. We regard this as a serious deficiency. We do not think that large-scale coal leasing should be permitted in an ecosystem until a large-enough sample of that ecosystem type has been reserved for designation as natural area or other ACEC on public land. We admit difficulties in applying this rule in states that lack agreed-upon plans for representative natural areas, but (a) these plans are forthcoming from state, federal, and private sources; (b) existence of the rule would speed production of the plans; and (c) the rule can be applied by reasonable (wo)men even in the absence of state or regional plans on the basis of existing habitat classifications.

(3) Paleontological sites, mentioned only under natural areas, should be treated separately. An agency interested in protecting

fossils is unlikely to designate such sites as natural areas because designation seems to invite rather than repel vandalism. (Witness Fossil Cycad National Monument, which is no more; by the time someone got there to protect it the cycads were gone.) The problem is complex, partly because recognition in an environmental statment of "unsuitability because of fossils" might be as inviting to vandals as natural-area designation. ACEC designation seems appropriate in those instances where salvage of the fossils is undesirable or impractical.

Regarding mitigation (Chapter 6) we are particularly impressed by the proposed requirement that needs for mitigation be given priority consideration in selection of tracts for leasing. Especially with regard to fossils, which are subject to mitigation measures (that is, scientific collection, preservation, and study) but only at high cost, this requirement may do good service. However, we worry that the necessity and the cost of protecting fossils--so important in New Mexico coal areas--are underemphasized in the Draft Statement. Requirements to survey fossils before construction or mining are important but are too weakly stated. The public has clear right to the scientific values of fossils on public lands, which must therefore be added to the cost of any project that would destroy them. It is too chancy to trust that the bulldozers will stop when they turn up important fossils; ample time and money must be allowed before heavy equipment is on the scene. We hope that the Final Statement will strongly affirm these principles under both "Impacts" and "Mitigation."

Sincerely,

Roger S. Peterson
Vice-President

PAGE T. JENKINS
Geologist
830 MIDLAND SAVINGS BLDG.
DENVER, COLORADO 80202
TELEPHONE 825-0887

February 8, 1979

Office of Coal Management (140)
Bureau of Land Management
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Washington, D. C. 20240

112

Gentlemen:

I submit the following review comments regarding the draft environmental statement for the Federal Coal Management Program. Both comments concern the leasing of coal to be produced by advanced coal technologies.

1. On page 5-131 under the heading of End Use Considerations, the text reads, "To encourage development of new technology....a lease stipulation could require the coal in the lease to be developed by a particular mining method (such as in-situ gasification) to protect lands that offer high potential for a new technology." I believe there is a need for encouraging development of new coal technologies and that lease terms can be an effective mechanism for advancing these new technologies. Other than stipulating the end use to which a coal lease can be put as exemplified in the above quotation, I suggest that certain lease terms as mandated by the Federal Coal Leasing Amendments Act of 1976 be modified for lessees and preference right lease applicants whose mining method is a new technology. Modifications recommended to encourage new technologies are:

--Extension to 15 years the period for achieving diligent development. Retention of the provision allowing the Secretary to grant one five year extension to the period for achieving diligent development because of time needed to complete development of advanced technology.

--Provision for advance royalties to be paid for 15 years.

--Extension of the total 40 year production time to 50 years where reserves are large enough to warrant such an extension.

Since the Department of Energy now has the authority to revise diligent development and continuous operation regulations and has established production goal levels for synthetic fuels produced by coal gasification, it seems appropriate that the Leasing Liaison Committee establish lease terms tailored to provide incentives for new coal technologies.

2. Department regulations require a preference right lease applicant to make a commercial quantities showing on the lands applied for. I believe some discretion should be used in the imposition of the commercial quantities test on PRLAs. I suggest that the commercial quantities test, as defined in the regulations, not be applied to PRLAs where a new technology is used as the

mining method. Instead, it would be more appropriate to substitute an apparent commercial quantities test. My logic for suggesting this alternate test is that data on commercial operations of many new coal technologies are just theoretical estimates since empirical numbers are not available.

Very truly yours,

Greg H. Thompson

GHT/jl

State of Montana
Office of The Governor
Helena, 59601

THOMAS L. JUDGE
GOVERNOR

February 13, 1979

Mr. Frank Gregg, Director
Bureau of Land Management
Office of Coal Management (140)
18th and C Streets, N. W.
Washington, D.C. 20240

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Dear Mr. Gregg:

The attached comments coupled with my testimony of January 24, 1979 represents the position and formal response of the State of Montana concerning the future leasing of federal lands for coal mining in Montana. The attached comments are specific in nature in contrast to the general comments of my testimony. They represent not only an academic review, but also a public concern for maintenance of our treasured quality of life in Montana.

The Federal Coal Leasing Program will have major significant impacts on Montana's future economy and upon our natural environment. One of our major concerns is the potential conflicts with state policies and goals. We have adopted numerous laws over the past few years to cope with energy development and to protect and preserve a quality of life we have no intention of losing. Coal development presents potential conflicts with our basic agriculture industry regarding land and water use. We will not destroy the future of agriculture in Montana to provide for coal development. With wise use and conservation we are confident that we can and will have both.

The attached comments address these concerns. Some are specific to Montana and others may have a universal connotation. Regardless of the nature of the comments, we trust that you will give them serious consideration and incorporate them in your final analysis. The involvement of this state in the decision making process is critically important and necessary for any viable decisions involving federal coal management in Montana.

Sincerely,

THOMAS L. JUDGE
Governor of Montana

The following are the State of Montana's comments regarding production targets and their apparent inadequacies.

The Department of the Interior (DOI) has not specified the process or provided the numerical data in the EIS to show how the coal production targets provided by the Department of Energy (DOE) have been "adjusted." It is important that the nature of the adjustments be clarified because the EIS notes that DOE high and mid-level projections will be met for all of DOI's coal management alternatives and that the "adjustment" will take the form of interregional transfers "in certain Western states." (p. S-3). The EIS also indicates that a primary goal of the coal management program is to help ensure that national energy plan (NEP) goals are met (p. 3-2). Personnel involved with the energy models used to derive the production targets indicate that NEP coal production goals were not used to determine coal demand. Nevertheless, DOE's high 1985 national coal demand projection is 1.186 million tons per year (Table 2_15), a figure very comparable to the President's announced coal production goal of 1.2 billion tons per year. Whether production of 1.2 billion tons of coal per year by 1985 is actually attainable or whether it is the best option for meeting energy needs has been questioned by many authorities, including government and industry. Also, it is unclear whether a proportionate share of 1.2 billion tons per year of effective demand is attainable for the market area of any given coal producing region.

Certain steps and input factors which DOI considered in its production target "adjustment" process are listed in Appendix H, Section H.2.2., p. H-7; however, demand for the coal does not appear to be included. The following statement indicates that the actual probable demand for the coal of any particular state may not have been considered:

> "The algorithym utilizes an origin/destination coal flow matrix upon which are superimposed predetermined western coal production levels. The O/D matrix is restructured so that regional energy demands are satisfied and the level of coal consumption for each region identified." (p. H-7, emphasis added).

The EIS does not clearly explain how the total production projections were divided among the producing regions, although least cost appears to have been the primary determinant for all factors considered. Demand for Powder River Coal in 1985 and 1990 is therefore linked to the economic efficiency of mining the region's thick coal seams, as indicated by the following statement:

> "...Within the Western regions, the greatest fluctuations in absolute terms (between the various leasing alternatives) would be experienced within the Powder River Coal Region....
>
> Given the Powder River Coal Region's land ownership patterns and the economic desirability of the coal resources, this disparity is to be expected. The coal industry, as any private enterprise, seeks to maximize profits in part by minimizing costs. Producers are attracted by the Powder River Coal Region's fields in Wyoming and Montana with their thick coal seams and relatively low seam thickness to overburden ratio's. Since the NCM production projections are based on the least cost linear programming model, the program alternative which depends on these projections similarly emphasizes production from the Powder River Coal Region. On the other hand, a policy of no new leasing would restrict available production both by preventing expansion of the Federal coal lease reserve base and by affecting the economic viability of private coal dependent upon adjacent Federal reserves for their development. The Powder River Coal Region is highly dependent on Federal leasing to expand production beyond currently planned levels." (p. 5-16, emphasis added).

In Chapter 2 DOI apparently calculated its planned production estimates in the Powder River for 1985 in terms of the amount of coal that it believes will actually be produced. This results in a smaller tonnage number than the production capacity of existing and newly approved mines. In Table 2-30 actual anticipated production rather than production capacity is compared with DOE production estimates, resulting in a greater apparent shortfall which DOI will use to determine the need for new leasing. This could be challenged as a weakness in the argument for the "need" for future leasing.

The EIS recognizes that the primary demand for Western coal is for electric generation. At least one Montana study of Montana coal demand "Electric Utility Coal Demand Scenarios for the Montana Energy Model" (MERDI, 1978), strongly contradicts the presumed need for the volume of coal which the EIS predicts the Montana portion of the Powder River Basin should be producing in 1985 and 1990. The Montana study is based on a survey of all known or announced plans for future coal-fired power plants in the Montana/Wyoming coal market area and estimates derived from individual state energy demand forecasts and data. The EIS acknowledges that coal will only be produced if there is a market for it (e.g., p. 2-30 and 2-44). For the Montana portion of the Powder River Basin, the 1985 production capacity of existing and currently approved Montana mines appears adequate to meet the Montana Coal demand study's high projections of electric utility demand as well as in-state coal requirements through at least the early 1990's.

Since the EIS does not include the origin-destination matrices which show predicted coal flows between 41 production areas and 53 consumption areas, a state cannot precisely examine whether the projected market area demands for its coal are realistic. A preliminary version of regional coal demand is included in a separate document entitled, "Federal Coal Leasing and 1985 and 1990 Regional Coal Production Forecast" (DOE, 1978), but even in this study, the coal flows are not broken out by state.

The coal production targets are the primary determining factor underlying the proposed coal leasing policy and management framework. Considering the important role new federal leasing would play in the Powder River Basin and other western coal producing regions, greater accountability for the targets would be desirable. Congressional review and acceptance of DOE's coal

production forecasts would not be unreasonable in light of the potentially massive impacts subsequent coal development decisions will impose on the West.

Appendix F presents coal production projections by state and includes projected in-state coal consumption as well. However, the process used to derive these numbers is not indicated. The manner in which Appendix F supports or is incorporated into the main body of the EIS is also not explained in the Appendix, although references may exist in the body of the text. The Montana and Wyoming shares and total Powder River production are summarized as follows (from Tables F-2 and F-3) in million tons per year (mtpy):

Production	1976	1985	1990
Montana	25.9	86.6	206.8
Wyoming	11.5	118.4	193.2
Total Powder River	37.4	205.0	400.0
Consumption	**1976**	**1985**	**1990**
Montana	1.34	12.7[1]	19.8[2]
Wyoming	4.89	3.9[1]	7.8[3]

[1]All steam generation

[2]Includes 11.25 steam and 8.55 low BTU syn gas

[3]Includes 1.58 steam and 6.22 high BTU syn gas

There are several obvious problems with this data. In 1976 Wyoming power plants consumed approximately 7.5 million tons of coal (mt) in electric generating plants and Montana plants consumed approximately 2.3 mt. It is not clear why Wyoming consumption is projected to be lower in 1985 than in 1976 and why Wyoming consumption is lower in both 1985 and 1990 than Montana since more coal-fired generating projects are already in operation or scheduled for construction in Wyoming. The Montana coal consumption projections are not unreasonable in light of future planned facilities which the state is aware of. However, if low BTU coal gasification by 1990 is among facility construction plans for Montana, the state of Montana would like to be informed.

On p. 2-24, three actions are specified which will be undertaken at the national level to address the problem of growing energy demands; these include expanded domestic use of coal, increased foreign supplies of oil and gas, and greater energy conservation. We in Montana would like to see a fourth action added, namely to allocate the necessary support and research efforts required to increase reliance on renewable forms of energy.

The follwing are specific comments and questions which relate directly to

coal production, supply and demand which have not been answered in the EIS.

1. Will the final EIS reconsider the aggregate coal production targets in terms of recent developments which mitigate the probable demand for coal--i.e., Mexican gas, Canadian gas availability, loosened Canadian crude restrictions, Alaskan gas, etc.?

2. Statement on p. 2-17 indicates that national installed hydroelectric capacity decreased from 1975 to 1977. This seems doubtful. Perhaps megawatt-hours produced decreased.

3. What is the source of the Appendix F data?

4. Does the decision to suspend the effective date of the strip mining rules affect the coal leasing EIS?

5. How does the BLM anticipate improving its data base to a level capable of making tract specific leasing decisions? (In most of eastern Montana adequate information has only been developed in the areas associated with or adjacent to existing mining.)

6. According to the EIS, "general public participation" apparently does not include the opportunity to comment on and potentially alter the overall production targets (e.g., p. 3-26). Also, Section 3.3.10 indicates that "the state's knowledge of, and concerns for, socio-economic factors would be critical in evaluating and disaggregating the regional production targets." State input (and public input from within the state) should not be limited to input focused solely on impact mitigation. States should also have a role in evaluating the inherent reasonableness of the targets based on available market information and forecasts.

The unsuitability criteria proposed for coal leasing cover a broad range of items and generally include the majority of possible environmental/coal mining conflicts as we have in Section 50-1042 R.C.M. 1947. These recommended criteria outlined in Table 3-1 are commendable in intent. However, in several instances the proposed exceptions seem to open up rather large potential loopholes. Each of the 24 criteria carries with it a logical and in some instances illogical exceptions. For example, an exception to the flood plain criteria reads: "Leasing a particular tract is the only practical alternative; . . ." Impracticality is also an exception in the Right-of-Way and Easement Criteria. Is impracticality a valid exception to sound environmental practices or is it simply an economic constraint? It appears to be an economic constraint which should be addressed but in a context other than here.

However, of even greater concern is the fact that in most cases the exceptions do not recognize the fact that a state may have more stringent regulations concerning certain unsuitability criteria. This is definitely the case in Montana where we have broad powers to allow or deny mining under Section 50-1042 of Montana's Strip and Underground Mine Reclamation Act. Recognition of approved state programs including state regulation in

determining exceptions to the criteria is included in only one of the 24 criteria namely the "reclaimability criterion". To assure a smooth process of lease issuance by the federal government and subsequent strip mine permit issuance by the state regulatory authority the exception should be imposed for all the criteria by adding to each exception "after consultation with the regulatory authority to assure compliance with State programs including State laws and regulations". This added stipulation might assure successful implementation of the proposed unsuitability criteria and might administratively solve potential delays and conflicts of future state and federal program compatibility.

Inherent also in the unsuitability exception criterion is the assumption that particular mining methods and mine plans will justify an exception. Unless lease stipulations are extremely precise and specific in relation to mining methods and plans these exception criteria might not be valid. Are specific mining methods going to be dictated in the lease stipulations to assure that the exception criteria apply?

Some more specific wildlife/reclamation oriented deficiencies noted in the EIS dealing directly with Montana are among the following.

There are several errors in the description of the Powder River Coal Region Environment. On page 4-19 the Powder River rather than the Tongue River should be named as a stream with a heavy sediment load. On page 4-20, prairie chickens are included as birds occurring in this area. However, it is very doubtful that any of this species occurs in the Powder River Coal Region. A reference is made on page 4-21 to a fish species called the shovelnose sturgeon chub. Actually, there is no such species. The authors are probably referring to a shovelnose sturgeon or a sturgeon chub.

In table H-15 (page H-29), it is questionable that in the Powder River Region, productivity in an upland forest (8.0 tons/acre) is greater than that in a wetland/bottomland forest (5.4). Also, it is difficult to believe that rangeland produces 6.7 tons per acre and pastureland only 1.7!

Some of the productivity data in Table D-1 appear to be questionable. If, as indicated, productivities per acre/year in the Powder River Region (page D-2) are 5.4 tons for floodplains and higher than this for prairie (6.7), hardwood forest (5.8), and evergreen forest (8.0), then it seems as though unsuitability criteria should include more than just the floodplain type.

Tables 7.3 and 7.4 are also very misleading. They seem to indicate that reclamation will reestablish "forest" in the Powder River and Fort Union regions. It should be pointed out that to date very little success has been noted in attempts to reestablish ponderosa pine in these regions.

Portions of chapter 7 discuss the fact that reclamation is by no means an assured thing in may areas of the arid west. Given this uncertainty, it is difficult to put much faith in table 7-5 where estimates of wildlife populations that could be supported on reclaimed lands are made.

While the above-mentioned errors and comments are rather minor, they do seem to indicate that these sections were written by someone unfamiliar with the area and apparently were not even reviewed by someone from the region. However, these sections still represent a vast improvement over previous efforts.

The discussion of Yellowstone River water availability on page 5-38 could be updated to reflect the recent Yellowstone water allocation decision made by the Montana Board of Natural Resources and Conservation. This decision could have a major impact also on the discussion of coal development in the Fort Union Coal Region.

The Section on Ecological Impacts beginning on page 5-72 appears to contain some conflicts. On page 5-75, the following statement apnear: "Since the specific tracts which may be leased are presently unknown, it is not possible to indicate the exact habitat which would be lost." Several paragraphs later, reference is made to table 5-45 which presents estimates of potential big game population reductions which would occur due to habitat loss. Since it is not possible (as previously stated) to indicate the exact habitat that would be lost, then how can potential big game population reductions which would occur due to habitat loss be calculated?

Also, the expression "pounds of trout/acre foot of stream" is a very unusual one and is in desperate need of clarification and/or definition. Under the wetlands criterion, it should be specified whether the 5 cfs is an average flow, a minimum flow, or which specific flow is intended. The Falcon Cliff Nesting Site Criterion (page 3-12) is not printed properly in the table - a portion of it is printed on page 3-10. Apparently page 3-12 should come between pages 3-9 and 3-10.

The following are comments primarily focused on the social and economic impacts of coal development. The Department of Interior is to be commended for its concern, awareness of problems and recognition of the limited resources available to forestall or alleviate adverse impacts. However the following are issues which are not adequately addressed in the EIS.

The draft implies a minimal responsibility on the part of the federal government for providing what we consider to be highly appropriate financial assistance to help mitigate adverse impacts. The statement is made: "The task of providing mitigation rests primarily with states." Montana has taken a lead in the nation in assuming its responsibilities toward the coal area through the establishment and use of our coal severance tax and our innovative approach to assisting impact communities through the Montana Coal Board. Recognizing that energy impact extends beyond the coal area, we are continuing to evaluate our role and to explore new possibilities. Montana has the highest coal severance tax in the nation -- and it is currently subject to challenge by the energy industry. We, therefore, find it ironic that in discussing the inadequacy and unresponsiveness of existing federal aid, the department of interior should recommend that "the more severely impacted states such as Wyoming and Montana could seek to raise revenue by other means, for example, through the imposition of an increased coal severance tax."

It is time for the federal government to make adequate provision for the local consequences of federal policy and federal action. The EIS recognized that with regard to adverse social and economic impacts from federal coal leasing, the Powder River and Fort Union Regions would be the most severely affected in the nation. The statement also, very appropriately, recognized the importance of timely information and effective planning as basic necessities in the process of mitigating adverse impacts. What the report does not give sufficient attention to is that current federal alternatives are inadequate to address the problem. The loan program of the Federal Mineral Leasing Act of 1920 is not only unfunded but would probably be totally unworkable if it were funded, both because it would infringe upon the state's traditional right to allocate those moneys and would disrupt the state's budgeting priorities and because the state could probably not implement the program without a constitutional change of questionable desirability. The one value of the act is that it recognizes the state and local need for funds "for planning, construction and maintenance of public facilities, and provision of public service." However, loans of any sort are not the only answer: the states loss of extracted natural resources is permanent; the tax benefits from the process are very short-term.

Unfortunately this draft fails to recognize, as some federal legislation fails to recognize, that those jurisdictions which experience the most severe adverse impacts may not be the same as those which accrue the chief tax benefit. The statement implies that an increase population is accompanied by an eventual increase in taxable valuation which eventually catches up with the cost of the additional demand for public services and facilities. In cities, towns and school districts this is not necessarily so: the catch-up may never occur. In that circumstance, loans can be part of the burden they are intended to alleviate and grants are much preferable. We are all familiar with interstate jurisdictional inequities, but they also occur within the state and it does not appear they can be completely nor equitably addressed by the state's adoption of any single jurisdictional mechanism, such as tax base sharing. By the same token, the statement suggests prepayment of taxes as a mechanism to help off-set tax lead time problems. Although Montana has legal provisions which would allow prepayment of taxes, every time prepayment has been proposed industry has threatened to challenge its constitutionality.

While the needs of impact communities are both recognizable and pressing, their circumstances are often such that they don't fit neatly into the pattern of criteria existing in federal funding programs.

The discussion of road-rail crossings and of their hazards indicates that dangerous crossings in rural areas probably cannot expect to receive any federal assistance for underpasses, overpasses, or even rail crossing protection devices: "In smaller communites, the local traffic volumes would be invariably too low to necessitate separated crossings or, in many instances, even flashing warning lights or crossing gates." We find very disturbing the implication that in the federal eye the life of a rural American is somehow worth less concern than the life an an urban American.

Although the draft addresses the problems associated with hauling coal

by truck or by train, it does not recognize the severe adverse effects on both state and county roads not just from an unaccustomed volume of commuter traffic but also from the hauling of heavy equipment to and from mine or facility sites. This stress and the construction of new or relocated roads can cause overwhelming highway and roadway expenses.

It seems questionable whether the section addressing loss of agricultural lands and productivity represents the situation fully -- for example, the chart illustrating the costs to agriculture cannot fully reflect the adverse impact on agriculture because it does not take into account the potentially extensive and extremely detrimental disruption of the region's aquifiers or possible increases in animal mortality because of air or water pollutants. These must be matters of concern to us as an agricultural state and as a nation which benefits from our agricultural productivity.

On page 5-87, it is stated that "Because coal transportation systems are not labor intensive, employment growth to transport coal would not be as dramatic as for mining or use of coal." This is opposite the findings of the Colstrip III and IV EIS. Which is correct?

Despite these and other concerns of considerable consequence to us, we applaud the intentions, expressed in this document, that the department will effectively involve both state and local government in determining criteria for lands unsuitable for development, in nominating specific unsuitable sites, and in ensuring the timely availability of accurate private information and the involvement of both private and federal sectors with state, local and tribal planners and decision-makers. It is our hope that this commendable effort will be a meaningful part of an effective process of optimal mitigation of the adverse social and economic effects of energy development.

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

122

ED HERSCHLER
GOVERNOR

February 12, 1979

Office of Coal Management
Bureau of Land Management
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Federal Coal Management
Program Draft Environmental
Statement

Dear Sirs:

In compliance with the National Environmental Policy Act, Office of Management and Budget Circular A-95, and the Wyoming State Review Procedures, the State of Wyoming has completed its review of the Federal Coal Management Program Draft Environmental Statement. State agency comments are attached.

In addition to these comments, my own testimony was presented in Casper, Wyoming, at a public hearing held on January 23, 1979. This testimony should be considered a part of the State review.

Thank you for providing the opportunity to review the Program.

Yours sincerely,

Ed Herschler

EH/tro
Attachments

THE STATE OF WYOMING

JAN 9 1979

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

LAND QUALITY DIVISION

STATE OFFICE BUILDING TELEPHONE 307-777-7758 CHEYENNE, WYOMING 82002

MEMORANDUM

TO: Robert Sundin, Director

FROM: W.C. Ackerman, Administrator

DATE: December 27, 1978

SUBJECT: Staff Comments on Federal Coal Management Program, a Draft Statement Prepared by the U.S. Department of Interior.

Enclosed are specific comments on the referenced DEIS.

WCA:sh
cc: Gary Beach

1. RE: Abbreviation Index

Because of the numerous abbreviations used, the document should be prefaced by an "abbreviation index".

2. RE: Section 2.7.3., Non-Federal, Non-Indian Coal

The draft statement assesses the development potential of non-Federal non-Indian reserves with a cutoff at 2,560 acres (minimum size of viable mining operation). However, the State of Wyoming presently has four pending applications for mine permits where non-Federal non-Indian coal reserves to support the mining operation will be much smaller than the cut-off utilized in the statement. These applications are:

WYMO Fuels - Subsidiary of Kansas City Power and Light. Produce 4 million T/yr. for 11 years with a total mine are of 612 acres.

Sheridan Enterprises - Welch Mine. Production at 1.05 million T/yr. for 11 years with total mine area of about 200 acres.

Dutchman Coal Mine - Production of 250,000 T/yr. for 53 years with a total mine area of 600 acres.

Fort Union Coal Mine - Production of 1.2 million T/yr. for 12 years with a total mine area of 415 acres.

All indications are that these operations constitute viable operations. Thus, it can be concluded that the DOI has considerably underestimated the development potential of non-Federal, non-Indian coal for the Powder River Basin Region.

3. RE: Section 2.8, The Need for New Federal Coal Leasing

Within the introduction to the draft statement (Chapter 1, Section 1.1) a question concerning the need for additional Federal coal leasing to meet the Nation's future energy needs is raised. This questions, probably originating from the *NRDC vs. Hughes* suit, is supposedly addressed in section 2.8 of the DES. However, the Department of Interior (DOI) supports renewed leasing on the premise of the Department of Energy's (DOE) planning. No substantive data or logic have been presented within the document which support renewed Federal coal leasing, other than DOE's projection. Thus a very important question of the whole Federal Coal Management Program has not been answered. If DOE is the lead agency for projecting future energy needs, then DOE should provide logic and an objective data base for their projections of future energy needs.

4. RE: Section 3.1.1., The Preferred Federal Coal Management Program

It is recommended that the Planning System, as described in sections 3.1.1.1. and 3.2.1., be restructured to combine concepts of the EMARS I and II programs. The initial screening of land by resource planners, the results of which would designate certain tracts of land acceptable for leasing consideration, should be guided in the initial stages of the planning by industry expressing interest in areas of mineral development. This could be handled through nominations as was conducted in the EMARS II program. This approach will provide resource planners at the on-set with guidance from the free-enterprise system which will be indicative of where coal reserves could economically be developed.

5. RE: Appendix A, Example Regulations, Section 3420.1-5(a) and (b)

Concerning split estates, referenced example regulations indicate that a split estate may not be leased if there does not exist "comprehensive land use plan prepared by the State". In the State of Wyoming where land use planning has been a slow process and where the Secretary could easily conclude that a comprehensive land use plan does not exist for the State, the impacts on coal development could be considerable. It is recommended that the term "comprehensive land use plan", as used for both federal estates and split estated be defined and where the term is applied to split estates, the State be deligated the authority to define a "comprehensive land use plan". It is recommended that this definition be broadened to qualify various resource plans and activities as criteria for leasibility.

GB:sh

THE STATE OF WYOMING

Ed Herschler, Governor
Lane Maughan, Superintendent and Chief Engineer

Wyoming State Highway Department

P. O. BOX 1708 CHEYENNE, WYOMING 82001

MEMORANDUM January 4, 1979

TO: State Planning Coordinator
Wyoming State Clearinghouse
2320 Capitol Avenue
Cheyenne, Wyoming 82002

FROM: William P. King, P.E., Environmental Services Engineer WPK

SUBJECT: Comments on Draft EIS for Federal Coal Management Program
State Identifier Number 78-136 D

1. The bulk of the discussion on transportation impacts dwells at length on the impacts on the railroad industry. However, discussion of impacts on people due to railroad transport of coal is so brief that the statement virtually ignores this major impact. The impacts of railroad/highway crossing blockage, community disruption, and financing mitigation measures warrant discussion in character with the rest of the text.

2. One important aspect that is understated and cloudy is that the preferred alternative and its various options is a means of mitigating the impacts of a no-leasing policy. Coal production and its associated impacts is controlled by the market for coal. With a no-lease policy existing mines and non-federal reserves will supply the market. Consequently, the impacts of coal production will occur regardless of the federal program selection. On the other hand, a sound federal management program is an essential element of a national coal resource management strategy that can serve to mitigate the impacts of a no-lease policy.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Recreation Commission

604 EAST 25TH STREET CHEYENNE, WYOMING 82002

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February 1, 1979

Mr. Richard Hartman
State Planning Coordinator
2320 Capitol Avenue
Cheyenne, Wyoming 82002

Dear Mr. Hartman:

The Wyoming Recreation Commission has received your memorandum of December 19, 1978, and accompanying "Draft Environmental Statement: Federal Coal Management Program 78-136D."

Our office appreciates the opportunity to comment upon this Draft ES regarding potential impact upon cultural resources. Since this is a general management plan suggesting various alternatives for a Federal coal management program, our staff will await future site specific coal mining proposals before commenting in detail.

Some general remarks, however, merit your attention. First, I am pleased to find that Chapter 4, "Description of Regional Environmental Environments" contains several sketchy historical sections entitled "The Environment and Man." Since this is an overall management plan, the omission of numerous historical events, personages, and sites from this section is understandable if unfortunate. Yet, it does not appear that adequate identification and/or evaluation of properties eligible for or enrolled in the National Register of Historic Places was performed for the Powder River Coal Region. The section mentions no sites enrolled in the National Register and Sheridan and Johnson Counties alone contain more that 65 historic sites eligible for or enrolled in the National Register. Section 4.6 "Green River-Hams Fork Coal Region" provides an adequate listing of 50 sites listed on the National Register. However, Danger Cave mentioned on page 4.6.2 is located within Tooele County, Idaho and not in Wyoming.

No reference is made in this management program to the Great Divide Basin in the description of the Green River-Hams Fork Coal Region. This formation is a unique geological phenomenon containing several land forms, plant types, animal species and bird species peculiar to that area. The Basin also contains several potential National Natural Landmarks which have been identified by studies done for the National Park Service. However, no mention is made of any of those potential landmarks. This area is richly endowed with paleontological and archeological remains. Surely an area with so many varied cultural resources deserves some type of mention in this study. The Great Divide Basin, per se, is given a cursory mention in conjunction with a casual composite reference to endangered animal and bird species.

Moreover, each environmental statement should address not only how the project will affect the recreational use of the land itself, but also give some thought to how the impact of people could hinder or enhance the quality of the environment. The impact of needed recreational areas and/or facilities to cater to an increased population, should be considered in this Federal Coal Management Program.

Finally, we would like to reiterate that as site-specific proposals arise, that the SHPO be notified at the earliest possible stages of planning. This early contact procedure will insure that future cultural survey work and personnel satisfy the minimum guidelines and qualifications adopted by our office in cooperation with certain federal agencies.

If you have any questions, feel free to contact the SHPO.

Sincerely,

Jan L. Wilson, Director and
State Historic Preservation Officer

JLW;GDK;TAS;RBS;kim

TESTIMONY OF

GOVERNOR ED HERSCHLER

TO

THE DEPARTMENT OF THE INTERIOR
ON ITS COAL MANAGEMENT PROGRAM
ENVIRONMENTAL STATEMENT

CASPER, WYOMING
JANUARY 23,1979

PRESENTED BY: ALAN MINER
NATURAL RESOURCES COORDINATOR
OFFICE OF THE STATE PLANNING COORDINATOR

I WOULD LIKE TO BEGIN MY TESTIMONY BY ACKNOWLEDGING THE STATE'S ROLE AS A PARTICIPANT IN THE DESIGN OF THIS FEDERAL COAL MANAGEMENT PROGRAM AND THIS ENVIRONMENTAL STATEMENT. SINCE LAST APRIL, OFFICIALS FROM WYOMING AND OUR SISTER STATES IN THE COAL-PRODUCING WEST HAVE HAD THE OPPORTUNITY TO COMMENT, CRITICIZE, AND SUGGEST, REGARDING ALL ASPECTS OF THE PROGRAM. THIS IS NOT TO SAY THAT I AM COMPLETELY SATISFIED WITH THE PROPOSAL, OR EVEN THAT THE VARIOUS AGENCIES OF WYOMING STATE GOVERNMENT AGREE ON ITS VIRTUES AND DEFECTS. BUT I DO THINK THAT THE PROPOSED PROGRAM BEARS THE STAMP OF THE STATES--PREDOMINANTLY A SHIFT TOWARD MAKING DISCRETIONARY DECISIONS AT THE STATE OR DISTRICT LEVEL, RATHER THAN IN WASHINGTON. AND I CAN SAY THAT I FIND FAR MORE TO LIKE ABOUT THIS PROPOSAL THAN MANY OF ITS PREDECESSORS IN THE PAST EIGHT MONTHS. PERHAPS MOST IMPORTANT, WE ACKNOWLEDGE A DEGREE OF RESPONSIBILITY FOR THE FEDERAL DECISIONS THAT ARE EMBODIED IN THE ENVIRONMENTAL STATEMENT.

THE PUBLICATION OF THIS DRAFT ENVIRONMENTAL STATEMENT IS IN MANY RESPECTS A MOMENTOUS OCCASION. IF NOT DISMANTLED OR SUBSTANTIALLY MODIFIED BY JUDICIAL REVIEW, IT MARKS THE ESTABLISHMENT OF GROUND RULES FOR FEDERAL COAL MANAGEMENT FOR THE GENERATION TO COME. IT

ALSO MARKS THE CULMINATION OF A PERIOD OF REVISION THAT BEGAN EARLIER IN THIS DECADE AND I THINK IT IS FAIR TO CHARACTERIZE THE RESULT OF THIS PERIOD AS A DECLINE OF THE ROLE OF PRIVATE INDUSTRY'S DISCRETION IN DEVELOPING FEDERAL RESOURCES. IN BROADEST TERMS, RECENT CONGRESSIONAL INITIATIVES HAVE:

(1) LIMITED THE PERIOD THAT PRIVATE INDUSTRY CAN HOLD FEDERAL COAL FOR DEVELOPMENT, HENCE REDUCING THE ROLE OF LONG-TERM PRIVATE PLANNING AND SPECULATION;

(2) PROVIDED FOR A MUCH HIGHER ASSURED RETURN TO THE FEDERAL TAXPAYER FOR DEVELOPMENT OF FEDERAL COAL;

(3) INCREASED THE ROLE OF FEDERAL LAND USE PLANNING IN THE DEVELOPMENT OF FEDERAL COAL, THUS REDUCING THE CHOICE OF PRIVATE INDUSTRY IN SPATIAL DISTRIBUTION OF DEVELOPMENT;

(4) PROVIDED MINIMUM STANDARDS FOR MINED LAND RECLAMATION, THUS REDUCING THE ROLE OF PRIVATE POLICY IN PROVIDING FOR ENVIRONMENTAL PROTECTION;

(5) INTRODUCED FEDERAL PRODUCTION TARGETS UNDER THE AUSPICES OF THE DEPARTMENT OF ENERGY, PROVIDING A BASIS FOR NOT ONLY INCREASED FEDERAL MONITORING OF THE MARKET BUT ALSO FOR A REVISION OF THE TRADITIONAL RELATIONSHIP BETWEEN PRIVATE INDUSTRY AND THE DEPARTMENT OF THE INTERIOR.

THE IMPLICIT RESULT OF THESE STRUCTURAL REVISIONS IS TO STRENGTHEN THE ROLE OF THE FEDERAL GOVERNMENT IN WYOMING, AND MORE SPECIFICALLY, THE ROLE OF THE BUREAU OF LAND MANAGEMENT. FURTHER, THERE WILL SOON BE MORE FEDERAL COAL PRODUCED IN WYOMING THAN ANY OTHER STATE IN THE UNION THE GROWTH AND STABILITY OF WYOMING'S ECONOMY WILL DEPEND IN LARGE MEASURE ON THE DEVELOPMENT OF THAT FEDERAL COAL, I MUST CONCLUDE THAT THE PROPOSED PROGRAM IS MORE IMPORTANT TO WYOMING THAN ANY OTHER STATE. WE MUST, THEREFORE BE EXCEEDINGLY CONSCIOUS NOT ONLY OF THE TERMS OF DEVELOPMENT OF FEDERAL COAL, BUT OUR RELATIONS WITH THE FEDERAL GOVERNMENT AS WELL. IN FACT, WE SHOULD SPEND LESS TIME WORRYING ABOUT THE NATIONALIZATION OF FEDERAL COAL, AND MORE TIME WORRYING ABOUT THE NATIONALIZATION OF WYOMING.

WITH THIS PERSPECTIVE IN MIND, I WOULD LIKE TO PRESENT A BRIEF OVERVIEW OF THE PROPOSED SYSTEM.

ANY REASONABLE REVIEWER OF THE CIRCUMSTANCES SURROUNDING FEDERAL COAL LEASING WILL CONCLUDE THAT SOME MODERATE DEGREE OF LEASING IS THE SENSIBLE CHOICE FOR AN OVERALL POLICY. FUNDAMENTALLY, THE EXTREME POTENTIALS FOR FEDERAL POLICY DON'T MAKE SENSE BECAUSE THEY IGNORE TOO MANY CONSIDERATIONS--MARKET DEMAND, NATIONAL ENERGY NEEDS, AND THE ANCILLARY COSTS OF COAL DEVELOPMENT. TO NAME A FEW. FOR EXAMPLE, THE ROLE OF

MARKET DEMAND CLEARLY MAKES NONSENSE OF THE NO-LEASING ALTERNATIVE: EXISTING LEASES WILL NOT YIELD PRODUCTION IF THERE IS NO MARKET DEMAND. THE DEMAND FACTOR CAUSES A SIMILAR PROBLEM WITH THE ALTERNATIVE OF LEASING TO MEET THE DEPARTMENT OF ENERGY'S OPTIMISTIC PRODUCTION GOALS; BECAUSE MORE COAL UNDER LEASE STILL WON'T INCREASE PRODUCTION IF DEMAND IS NOT THERE. BOTH OF THESE ALTERNATIVES ARE CONSIDERED IN THE ENVIRONMENTAL STATEMENT.

SO THE CHALLENGE FOR CREATING A FEDERAL PROGRAM HAS NOT BEEN THE SIMPLE BUSINESS OF DECIDING THAT A MODERATE LEASING PROGRAM IS JUSTIFIED: INSTEAD, THE CHALLENGE HAS BEEN TO CREATE A RATIONAL PROGRAM FROM AN AWESOME TANGLE OF FEDERAL STATUTE, JUDICIAL DECISIONS, AND ADMINISTRATIVE DISCRETION. CHAPTER ONE OF THE ENVIRONMENTAL STATEMENT ROUGHLY SUMMARIZES THESE CONSTRAINTS. IT IS WORTH EMPHASIZING THAT MANY ALTERNATIVES OR POLICIES WHICH WOULD SEEM SENSIBLE TO WYOMING CITIZENS ARE SIMPLY NOT AVAILABLE AS ELEMENTS OF A MODERATE LEASING PROGRAM. ONE CANNOT, FOR EXAMPLE, IGNORE THE STATUTORY REQUIREMENTS FOR DUE DILIGENCE, EVEN THOUGH SOME OF OUR STATE OFFICIALS BELIEVE THAT IT IS UNSOUND POLICY. THE PRACTICAL BUSINESS OF CREATING A SOUND PROGRAM HAS BEEN FURTHER COMPLICATED BY THE FACT THAT, WITH THE RECENT AND SUBSTANTIAL CHANGES IN UNDERLYING CONGRESSIONAL LEGISLATION, THERE IS NO SUCH

THING AS AN "OLD HAND" WITH RELIABLE ADVICE. WE ARE, THEREFORE, LIKELY TO YIELD ALL SORTS OF UNFORESEEN PRACTICAL PROBLEMS WITH THE EMERGING PROGRAM, AND I AM SURE THAT WE WILL BE LOOKING FORWARD TO SEVERAL YEARS OF ADJUSTMENTS EVEN IF THE OVERALL PROPOSAL PROVES SUCCESSFUL.

THE PROGRAM WHICH HAS EMERGED AS THE PREFERRED ALTERNATIVE ACTUALLY CAN BE SUMMARIZED QUITE SIMPLY. IT IS LARGELY A MATTER OF SCREENING OUT UNDESIRABLE OR LESS DESIRABLE ALTERNATIVE TRACTS, TO REACH A LIMITED POOL THAT WILL BE OFFERED TO INDUSTRY FOR DEVELOPMENT ON A COMPETITIVE BASIS. WHILE INDUSTRY IS OFFERED AN OPPORTUNITY TO EXPRESS ITS INTEREST, THE SYSTEM IS DRIVEN BY THIS SCREENING PROCESS.

THE FIRST LEVEL OF THE SYSTEM IS THE LAND USE PLANNING PROCESS OF THE BUREAU OF LAND MANAGEMENT THIS PROCESS HAS BEEN REVISED IN A FASHION WHICH MAKES IT MORE SUITABLE FOR THE PURPOSES OF FEDERAL COAL MANAGEMENT, AS WELL AS OTHER PURPOSES. DRAFT REGULATIONS WERE PUBLISHED IN THE FEDERAL REGISTER DECEMBER 15. THE SECOND LEVEL OF THE SYSTEM IS THE APPLICATION OF CRITERIA DESIGNED TO ELIMINATE LANDS WHICH, FOR A VARIETY OF PREDOMINANTLY ENVIRONMENTAL REASONS, SHOULD NOT BE OFFERED FOR LEASE. THESE CRITERIA WERE PUBLISHED ON DECEMBER 3. THE THIRD LEVEL

OF THE SYSTEM IS THE PROCESS FOR RANKING AND SELECTING TRACTS. A DETAILED DESCRIPTION OF THESE PROCEDURES IS NOT AVAILABLE, AND HAS NOT BEEN FINALIZED. IT IS AT THIS LAST LEVEL OF THE SYSTEM THAT MODIFIED PRODUCTION TARGETS OF THE DEPARTMENT OF ENERGY ARE USED TO DETERMINE HOW MUCH COAL SHOULD BE OFFERED FOR LEASE.

TO SUMMARIZE, THEN, WE ARE LOOKING AT A COMPLEX PROPOSAL OF GREAT MOMENT FOR WYOMING. WHILE IT DEMANDS A RESPONSE, A RESPONSE MUST BE CAUTIOUS, SINCE THE PROPOSAL IS NOT ONLY COMPLEX BUT ALSO INCOMPLETE. UNTIL I SEE ALL OF THE FINAL DETAILS, AND UNTIL I HAVE A CHANCE TO SEE IT WORK, I MUST RESERVE JUDGMENT ON MANY OF ITS ASPECTS.

DESPITE THIS CAUTION, I CAN STILL MAKE A NUMBER OF PRELIMINARY JUDGMENTS BY ASKING A NUMBER OF QUESTIONS WHICH REFLECT WYOMING'S INTERESTS IN THE PROGRAM. I HAVE SIX SUCH QUESTIONS TODAY, AND I MAY HAVE MORE IN THE FUTURE. I BELIEVE THAT THESE QUESTIONS, AND OUR TENTATIVE ANSWERS TO THEM, EFFECTIVELY ILLUSTRATE THE STATE'S POSTURE WITHOUT OVERSTATING OR UNDERSTATING OUR SUPPORT FOR THE PREFERRED ALTERNATIVE.

FIRST: HAS THE FEDERAL GOVERNMENT ADEQUATELY DISCLOSED ITS INTENTIONS FOR THE DEVELOPMENT OF FEDERAL COAL IN WYOMING?

One of the strong points of the environmental statement is its effort to fully disclose this prospect. It appears that I can reliably say that Wyoming, and particularly Wyoming's Powder River Basin, will become the pre-eminent producer of federal coal in just a few years.

Outside of the confines of the statement, it appears that I can also make sound guesses about the schedule for leasing. In the event that Secretary Andrus adopts the preferred alternative, we are likely to see a modest lease sale in mid-1980. Tracts would come from northeastern Wyoming, northern Colorado, and southern Utah. To meet procedural requirements, the 1980 sale would foreclose new indications of industry interest, streamline public participation, and provide for a very limited number of new leases in a handful of largely uncontroversial locations. The first lease sale, then, will shape up as a sort of test of the program.

I will further note that once the system has begun to operate, many of the decisions on future development will be decentralized, to the level of the coal supply regions and below. If these structural aspects of the preferred alternative are implemented, Wyoming will be in a position to modify federal intentions by injecting

its own. If this comes to pass, it is undoubtedly worthy of my support.

Second: Will the program work? Will it provide a stable framework for the long term? Are there noticeable weaknesses which must be corrected for either short-term or long-term success?

This interest embraces the agenda of program detail which must be completed before regulations can be published, and practical difficulties with program elements that are already settled. With a program of this complexity, the list is potentially lengthy, so I will address points which are illustrative rather than exhaustive.

(1) One concern is vulnerability to legal challenge. Chapter 2.8 of the environmental statement explains the rationale for further leasing. It is an important chapter because a demonstration of the need for renewed leasing was crucial to the lawsuit which stopped the last federal leasing program. The new chapter is as strong as possible given the available information, and a sound presentation of the appropriate considerations.

(2) I am not entirely satisfied with the Department of Energy model which helps drive the

program, and directly affects the level of leasing. The model's strong points are the credibility of its regional allocation of production, its emphasis on coal as utility fuel, and the insights provided by its sensitivity analysis. Its weak points are its derivation of demand and the fact that it is not reliable below the regional level.

The possible consequences of the weak points are disturbing. The weakness in demand forecasting means that one must be particularly careful to avoid treating it as some kind of wizard: this will be difficult since neither Interior nor Wyoming has any comparable capacity to forecast production. I strongly support the principle of collective modification embodied in the example regulations, that is, the idea that the DOE projections can be modified to suit alternative estimates of demand.

The fact that the model is unreliable below the regional level presents another kind of problem. Should present schemes for tract ranking and selection on a regional basis fail, it may be difficult to design an alternative which includes the DOE projections in the same way, since production target decisions for sub-regional areas would become a great deal more arbitrary than those presently supported by the model.

Failing at the regional level may, therefore, mean failing entirely since production allocation is a major factor in the system. We can only hope that substantial difficulties with the regional selection system do not arise.

(3) I am concerned that the conceptual implementation of statutory fair market value requirements may be too complicated to be workable. The transformation of techniques that inform market decisions into techniques that comprise regulatory mandates often yields unforeseen or undesirable consequences, not the least of which are ever more applications of technical concepts. One example is the limitation on surface owner compensation, which is tied to fair market value determinations. I would prefer to see federal analysis based on simpler conceptions of protection for the federal taxpayer, which I believe was the Congressional purpose for the fair market value requirement.

(4) I am concerned that the Department of the Interior may have two major sorts of internal difficulties with the program.

The first is insufficient funds and personnel to make the system work. The preferred alternative clearly demands a great deal of data and a great deal

OF MANPOWER, SO MUCH THAT IT IS VULNERABLE TO BREAKDOWN IF CONGRESS LOSES ITS ENTHUSIASM FOR RESOURCE MANAGEMENT IN THIS PROPOSITION 13 ERA. I AM ENCOURAGED BY THE FACT THAT THE PREFERRED ALTERNATIVE LENDS ITSELF WELL TO THE ESTABLISHMENT OF PRIORITIES FOR INTERIOR'S RESOURCES, AND BY RECENT INDICATIONS THAT INTERIOR WILL NOT ATTEMPT TO BRING THE ENTIRE PROGRAM TO FULL SPEED AT ONCE.

THE SECOND PROBLEM IS LINES OF COMMUNICATION BETWEEN WASHINGTON AND BLM IN THE FIELD. IN THE PAST THIS HAS RESULTED IN CONFUSION AND DELAY THAT HAS HURT WYOMING CITIZENS. IN THIS REGARD, I AM ENCOURAGED BY DECISIONS WHICH DECENTRALIZE PROGRAM RESPONSIBILITIES TO THE STATE LEVEL. ONE EXAMPLE IS A CHANGE IN THE BLM LAND USE PLANNING REGULATIONS WHICH ALLOWS THE STATE DIRECTOR TO SUBMIT ENVIRONMENTAL STATEMENTS DIRECTLY TO THE ENVIRONMENTAL PROTECTION AGENCY WITHOUT FURTHER CLEARANCE FROM WASHINGTON.

(5) I AM CONCERNED THAT MANY OF ECONOMICS-ORIENTED POLICY QUESTIONS, OR SUCH TOPICS AS BIDDING SYSTEMS, ALLOCATED BY STATUTE TO THE DEPARTMENT OF ENERGY, HAVE NOT BEEN RESOLVED. I REALIZE THAT THE DEPARTMENT OF THE INTERIOR HAS NO CONTROL OVER THE DEPARTMENT OF ENERGY, BUT THE COORDINATED WORKING RELATIONSHIP OF THE TWO AGENCIES MUST BE STRONG IN

PRACTICE. THE VAGUE MEMORANDUM OF UNDERSTANDING FOUND IN APPENDIX B OF THE ENVIRONMENTAL STATEMENT IS NO GUARANTEE OF PERFORMANCE. INTERIOR ESTABLISHED A RIGOROUS SCHEDULE FOR ITSELF AND HAS HELD TO IT. IT SEEMS THAT ENERGY SHOULD DO THE SAME.

(6) I AM CONCERNED THAT THE POLICIES SURROUNDING THE QUESTION OF SURFACE OWNER CONSENT MAY PROVE UNWORKABLE. THE PRACTICAL EFFECT OF THESE PROVISIONS, DESIGNED TO PROTECT LANDOWNERS WHO HAVE HELD THEIR LANDS FOR OVER THREE YEARS, IS STILL A QUESTION MARK. WHERE THE EFFECT IS TO ALLOW A SINGLE SURFACE OWNER, HOLDING OUT SOLELY FOR THE PURPOSE OF PERSONAL GAIN, TO STALL DEVELOPMENT IN AN OTHERWISE DESIRABLE LOCATION, STRONG PRESSURES WILL BE GENERATED TO LIMIT PROTECTION FOR ALL LANDOWNERS. I HAVE NO IDEAL ALTERNATIVE TO THAT FOUND IN THE PREFERRED ALTERNATIVE. I ONLY WISH TO IDENTIFY THIS AS A PROBLEM WHICH IS LIKELY TO WARRANT CONTINUING ATTENTION.

AS I NOTED ABOVE, MUCH REMAINS TO BE DONE WITH THE PREFERRED ALTERNATIVE, AND MANY OF MY JUDGMENTS WILL BE RESERVED UNTIL I SEE HOW THESE POTENTIAL PROBLEMS ARE ADDRESSED.

THIRD. DOES THE PREFERRED ALTERNATIVE RESPECT THE INTEGRITY OF WYOMING'S INSTITUTIONS?

WYOMING HAS CREATED MANY ORGANS OF STATE AND LOCAL GOVERNMENT WHICH DEAL WITH VARIOUS ASPECTS OF COAL DEVELOPMENT. WHERE WYOMING HAS ADDRESSED THESE QUESTIONS, I NATURALLY OPPOSE FEDERAL ACTIONS WHICH WOULD PRE-EMPT OR TEND TO ABROGATE FUNCTIONING STATE AND LOCAL AUTHORITIES. BY AND LARGE, THE PREFERRED ALTERNATIVE HAS SUCCESSFULLY AVOIDED THESE SORTS OF CONFLICTS. A NUMBER OF EXAMPLES ILLUSTRATE THE PROBLEM AND THE POINT.

(1) THE LAND QUALITY DIVISION OF THE DEPARTMENT OF ENVIRONMENTAL QUALITY HAS PRIMARY AUTHORITY FOR MINED LAND RECLAMATION IN WYOMING. IT IS POSSIBLE FOR STIPULATIONS IN BLM LEASES TO INFRINGE UPON THE DETERMINATIONS THAT ARE PROPERLY LEFT TO OUR STATE REGULATORY AUTHORITY. THE PREFERRED ALTERNATIVE HAS CONSCIOUSLY AVOIDED THIS CONFLICT.

(2) OUR INDUSTRIAL SITING COUNCIL PROTECTS THE HEALTH AND WELFARE OF WYOMING BY OPERATING PERMIT PROCEDURES WHICH THOROUGHLY EXAMINE NEW ENERGY FACILITIES IN WYOMING. INTERIOR HAS PROPOSED AN INVESTIGATION OF ITS AUTHORITY TO REGULATE THE END USES OF COAL, WHICH MIGHT AFFECT THE POWERS OF OUR STATE AUTHORITY. THE PROPOSAL IS PRESENTLY TABLED FOR FURTHER STUDY, AND I HOPE THAT IT WILL REMAIN TABLED INDEFINITELY.

(3) OUR DEPARTMENT OF GAME AND FISH IS THE APPROPRIATE MANAGER OF ALL OF WYOMING'S WILDLIFE RESOURCES. THIS PRIMACY IS RECOGNIZED BY SPECIFIC OPPORTUNITIES FOR PARTICIPATION THROUGHOUT THE SYSTEM, INCLUDING THE FIFTEENTH CRITERIA FOR EXCLUDING LANDS FROM FURTHER CONSIDERATION FOR LEASING.

(4) WYOMING HAS A LAND USE PLANNING STATUTE AND RELATED PROCEDURES. I WOULD OPPOSE ANY ATTEMPTS TO FOIST SPECIFIC AND ADDITIONAL FEDERAL REQUIREMENTS ON THIS STRUCTURE, SUCH AS SPECIFIC PLAN CONTENTS OR SPECIFIC MEASURES FOR PLAN IMPLEMENTATION. WHERE STATE AND LOCAL LAND USE PLANS ARE REFERENCED, IN THE PREFERRED ALTERNATIVE, I HAVE NOT SEEN THESE SORTS OF REQUIREMENTS.

IN SHORT THE PREFERRED ALTERNATIVE GENERALLY EVIDENCES A PROPER REGARD FOR WYOMING'S STRUCTURES OF GOVERNMENT.

FOURTH: HOW WILL INTERIOR ADDRESS THE SOCIAL AND ECONOMIC IMPACTS OF COAL DEVELOPMENT?

MY VIEW IS, AND HAS BEEN, THAT INTERIOR CANNOT MANAGE ENERGY DEVELOPMENT IMPACTS. THIS BURDEN FALLS LARGELY, IF NOT ENTIRELY, ON LOCAL GOVERNMENT AND STATE GOVERNMENT, IN THAT ORDER. THE ONLY CONTROL THAT INTERIOR CAN EXERCISE IS OVER THE TIMING AND SPATIAL

DISTRIBUTION OF NEW COAL DEVELOPMENTS, ALTHOUGH I READILY SEE THAT THESE AUTHORITIES ARE SUBSTANTIALLY STRONGER UNDER THE PREFERRED ALTERNATIVE THAN UNDER PAST PROPOSALS. HOWEVER, IN THE PAST INTERIOR HAS NOT EFFECTIVELY EXERCISED ITS LIMITED AUTHORITIES. I AM INCLINED TO BELIEVE THAT THIS IS BECAUSE INTERIOR HAS NEVER BEEN ACCOUNTABLE FOR DEVELOPMENT IMPACTS.

I SEE TWO POSITIVE DEVELOPMENTS ON THIS QUESTION. THE FIRST IS THAT INTERIOR HAS ESSENTIALLY ADOPTED MY VIEW OF THE PROBLEM, AS EXPLAINED IN CHAPTER SIX OF THE ENVIRONMENTAL STATEMENT.

THE SECOND IS THAT WE MAY JOINTLY ESTABLISH PROCEDURES WHICH EFFECTIVELY INJECT IMPACT CONSIDERATIONS INTO LEASING DECISIONS, DURING THE TRACT RANKING AND SELECTION STAGE OF THE SYSTEM. TRACT RANKING AND SELECTION WILL BE DONE ON THE BASIS OF PRODUCTION REGIONS. ONE ALTERNATIVE FOR MAKING DECISIONS ON RANKING AND SELECTION IS TO CONVENE A COMMITTEE WHICH DIRECTLY INCLUDES STATE PARTICIPANTS -- IN THE POWDER RIVER BASIN, FOR EXAMPLE, TO CONVENE A COMMITTEE OF FIVE: GOVERNOR'S REPRESENTATIVES FROM WYOMING AND MONTANA, BLM STATE DIRECTORS FROM WYOMING AND MONTANA, AND A BLM OFFICIAL RESPONSIBLE FOR PREPARING THE ENVIRONMENTAL STATEMENT ON THE REGION. TRACT DECISIONS WOULD ACCORDINGLY BE MADE WITH DIRECT

STATE PARTICIPATION, BASED ON CRITERIA WHICH WOULD INCLUDE THE IMPACTS OF INDIVIDUAL TRACTS AND THE CUMULATIVE IMPACTS OF A PATTERN OF TRACTS. THIS MECHANISM WOULD INCREASE MY CONFIDENCE IN THE WISDOM OF THE TRACT JUDGMENTS AND INTRODUCE A NEW ELEMENT OF ACCOUNTABILITY INTO FEDERAL LEASING. I STRONGLY SUPORT IT.

FIFTH: DO THE GOVERNMENTS AND CITIZENS OF WYOMING HAVE AN OPPORTUNITY FOR EFFECTIVE PARTICIPATION IN LEASING DECISIONS?

ON PAPER, THE PREFERRED ALTERNATIVE IS RIDDLED WITH OPPORTUNITIES FOR PUBLIC PARTICIPATION. LOOKING TO THE STATE ALONE, THERE IS APPARENT OPPORTUNITY AT EVERY STAGE OF THE PREFERRED ALTERNATIVE. THERE ARE INVITATIONS TO ENTER INTO FORMAL AGREEMENTS WITH THE BLM STATE DIRECTOR FOR BLM'S LAND USE PLANNING; THE UNSUITABILITY CRITERIA INCLUDE OPPORTUNITIES TO PROTECT STATE RESIDENT FISH AND WILDLIFE; DEPARTMENT OF ENERGY PROJECTIONS ARE MODIFIED WITH STATE CONSULTATION; AND TRACT RANKING AND SELECTION MAY ULTIMATELY BE IMPLEMENTED WITH FULL STATE PARTICIPATION.

DESPITE THE ATTRACTIVENESS OF THE PROGRAM DESIGN, THIS QUESTION CAN ONLY BE ANSWERED IN PRACTICE. I WOULD BE LESS THAN CANDID IF I WERE TO PRAISE OUR PAST WORKING RELATIONS WITH BLM IN THE FIELD. MOST STATE

OFFICIALS FEEL THAT WORKING PARTICIPATION WITH BLM MEANS NOTHING MORE THAN THE DUBIOUS HONOR OF CONDUCTING ENDLESS PAPERWORK, WELL INSULATED FROM ANY GENUINE EFFECT ON FEDERAL RESOURCE DECISIONS. THIS DISSATISFACTION HAS BEEN AMPLIFIED BY BLM'S OWN DIFFICULTIES WITH ESTABLISHING A RELIABLE STRUCTURE BETWEEN WASHINGTON AND THE FIELD. THE ONLY STRUCTURAL CHANGE IN THE PREFERRED ALTERNATIVE WHICH CLEARLY COUNTERS THESE PROBLEMS IS THE SCHEME FOR TRACT RANKING AND SELECTION, WHICH FEATURES DIRECT STATE PARTICIPATION.

I DO NOT REGARD THE SITUATION AS HOPELESS, HOWEVER. FOR THE SHORT TERM, I WILL LOOK TO THE GROWTH FOR INFORMAL, RATHER THAN FORMAL, WORKING RELATIONS WITH BLM TO SEE WHAT THE FUTURE HOLDS. IT IS MY GOAL TO DISCUSS MATTERS OF MUTUAL INTEREST ON A TIMELY BASIS, WITH REASONABLE MANPOWER DEMANDS ON BOTH SIDES. I WILL RESERVE JUDGMENT ON THE MORE AMBITIOUS ASPECTS OF THE PREFERRED ALTERNATIVE UNTIL I SEE WHETHER PROGRESS IS POSSIBLE ON THESE SIMPLER INTERACTIONS.

SIXTH: DOES THE PREFERRED ALTERNATIVE PROGRAM FORCE UNDESIRED ADMINISTRATIVE BURDENS ON WYOMING TAXPAYERS? DOES IT IMPLICITLY REQUIRE MODIFICATIONS IN EXISTING LEGISLATION AND BUDGETS?

WYOMING HAS GROWN WEARY OF FEDERAL PROGRAMS WHICH

REQUIRE STATE TAXPAYERS TO FOOT THE BILL. IN THE EXTREME CASE, INTERIOR'S OFFICE OF SURFACE MINING. I EVEN SEE A NEW FEDERAL BUREAUCRACY WHOSE SOLE PURPOSE IS APPARENTLY TO HARASS AN ESTABLISHED AND EFFECTIVE STATE AGENCY. IN THE SAME CASE, WYOMING HAS BEEN SUBJECTED TO ENDLESS AND QUESTIONABLE DEMANDS FOR ADJUSTMENTS TO STATE LEGISLATION WHICH IS ALREADY PROTECTING THE ENVIRONMENT.

I DO NOT BELIEVE THAT THE PREFERRED ALTERNATIVE CREATES THESE SORTS OF PROBLEMS. THE PROGRAM IS STRUCTURED AROUND STATE OPTIONS, NOT STATE REQUIREMENTS. THERE ARE NONE OF THE BURDENSOME STATUTORY DEADLINES WHICH ELIMINATE WYOMING'S ABILITY TO EXPERIMENT WITH EFFECTIVE GOVERNMENT. NO NEW LEGISLATIVE AUTHORITY WILL BE REQUIRED TO PARTICIPATE AT ANY STAGE. AND A DETERMINATION ON NEW MANPOWER REQUIREMENTS CAN WAIT UNTIL I HAVE HAD A CHANCE TO SEE IF THE PREFERRED ALTERNATIVE IS IMPLEMENTED AND IF IT WORKS.

NOR DOES THE PREFERRED ALTERNATIVE REQUIRE MODIFICATION OF WYOMING'S OWN COAL LEASING SYSTEM. OURS IS ALSO A GREAT DEAL LESS EXPENSIVE TO ADMINISTER, AND ITS PRODUCTION IS LIKELY TO BE CONTROLLED BY FEDERAL COAL MANAGEMENT DECISIONS. WE CAN WELL AFFORD TO WAIT AND SEE WHETHER ADJUSTMENTS ARE NECESSARY.

I BEGAN THESE SIX QUESTIONS WITH A WORD OF CAUTION AND I BELIEVE THAT I CAN CONCLUDE WITH CAUTIOUS OPTIMISM. GIVEN THE FUNDAMENTAL CONGRESSIONAL CONSTRAINTS, THERE IS A GREAT DEAL TO LIKE IN THE DESIGN OF THE PROGRAM. THIS MUST BE BALANCED AGAINST SUBSTANTIAL UNCERTAINTIES CONCERNING ITS OPERATIONS AND ITS IMPLICATIONS FOR THE FUTURE OF FEDERAL-STATE RELATIONS IN WYOMING. THIS UNCERTAIN BALANCE RAISES A FINAL QUESTION OF ITS OWN: WHAT DOES THE STATE INTEND TO DO NOW?

FIRST, I INTEND TO CONTINUE PARTICIPATION IN THE PROGRAM DESIGN EFFORT WHICH BEGAN LAST APRIL. AS I HAVE INDICATED REPEATEDLY, THE PROGRAMMATIC ENVIRONMENTAL STATEMENT IS LARGELY COMPLETE, BUT MUCH REMAINS TO BE DONE ON THE PROGRAM. I PREFER TO BE A PART OF THOSE DECISIONS, IN CONJUNCTION WITH THE GOVERNORS OF OUR SISTER STATES IN THE COAL-PRODUCING WEST.

SECOND, FOR THE NEAR TERM I WILL EXPLORE THE VARIOUS ASPECTS OF STATE PARTICIPATION IN THE OPERATION OF THE PROGRAM. AS I SAID EARLIER, THE FIRST LEASE SALE WILL NOT BE A FULL-BLOWN EFFORT. IT APPEARS THAT I CAN PROCEED WITHOUT NEW COSTS TO THE WYOMING TAXPAYER.

THIRD, FOR THE LONG TERM, I WILL WAIT AND SEE WHAT

HAPPENS.

I WISH TO THANK YOU FOR THE OPPORTUNITY TO APPEAR TODAY, AND I HOPE THAT THESE VIEWS HAVE BEEN HELPFUL.

RECEIVED
'79 FEB 22 PM 12 16
OFFICE OF COAL MANAGEMENT (140)

United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
L7615(135)

Memorandum

To: Director, Bureau of Land Management

From: Director, National Park Service

Subject: Comments on Draft Environmental Statement, Federal Coal Management Program (DES 78-50)

General: The preferred alternative seems the most sound of the seven presentad. However, throughout the report and particularly in Chapter 2, it is emphasized that new coal leasing will be necessary to satisfy future demand since nearly all existing non-producing leases will be cancelled in 1986. The incongruity of this situation (cancelling leases and issuing new ones at the same time) should be examined further. Once the coal management program policies and criteria are applied to existing non-producing leases as outlined in section 3.1.1.5, it might develop that enough acceptable leases of commercial quality exist to obviate or reduce the need for a new leasing program. Although some means might be found to get the "good" idle leases into production, the possibility is never discussed in the DES.

Considering the general scope of this programmatic EIS, the document appears to be well written and credible. Minor details excepted, the physical and biological descriptions of environment and impacts are as accurate as can be expected within the broad geographic coverage of the EIS. Again with minor exceptions the EIS gives appreciable attention to Natural as well as Historic landmarks. The document appears to be fairly well balanced, covering the physical-biological, socio-economic, and legal aspects resulting from or related to renewed coal leasing.

Specific:

p. 1-21 P.L. 94-429 should be included in the list of pp. 1-17 to 1-21. Sec. 9 of this law requires a determination whether any natural landmark is threatened or being destroyed by any surface mining activitiy. The major relevance is recognition and protection of nationally significant natural areas as they relate to surface mining.

January 26, 1979 OA/Dx61

TO: FP - R. Lehman

FROM: OA/Dx61 - Douglas M. LaCorte

SUBJECT: DEIS 7812.16 Federal Coal Management Program

Page 7-1: A discussion of long-term consequences resulting from the use of coal should allude to the belief among some climatologists that fossil fuel burning will lead to unacceptably high levels of carbon dioxide in the atmosphere. The resultant "greenhouse effect" would increase the mean atmosphere temperature by several degrees, resulting in the onset of significant climatological changes. However, not all climatologists agree that increased atmospheric CO_2 will significantly affect the climate, and whether the net impact of any such climate change would be favorable or unfavorable is not known. Energy policy-makers should, nevertheless, be aware that possibly negative climatic impacts could result from increased development of coal resources.

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230 (202) 377-3111

4335

February 13, 1979

00286

Mr. Frank Gregg, Director
Office of Coal Management (140)
Bureau of Land Management
Department of the Interior
18th and C Streets, N. W.
Washington D. C. 20240

Dear Mr. Gregg:

This is in reference to your draft environmental impact statement entitled, "Federal Coal Management Program." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight (8) copies of the final environmental impact statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure Memo from: Mr. Douglas M. LeComte
Environmental Data and
Information Service
OA/Dx61

p. 2-17 The trend of increasing production of oil and gas from the
2-24 "overthrust belt" is not discussed. Supplies becoming available from this new source should markedly affect growth of coal demand in the West, where it is stated that the majority of Federal leasing would take place.

Pages 5-59 thru 5-72 show tables of estimates of emissions of SO_2, particulates, and other pollutants for 1985 and 1990 under the several alternative plans as well as the preferred program. These show increases for the western areas, in particular those in the Southwest. The Bureau of Land Management should ensure that the requirements of the Clean Air Act Amendments of 1977 are fulfilled and that the program is implemented in a manner that will not impair the air quality related values that are a highly significant component of the environment of units of the National Park System in this region.

Gen J. Hutchinson

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1426 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

In Reply Refer To

00266

(ES) SLC February 27, 1979

MEMORANDUM

TO: Office of Coal Management (140)
Bureau of Land Management
Washington, D.C.

FROM: Acting Area Manager
U.S. Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: Draft Environmental Statement - Federal Coal Leasing Program - December 1978

The Fish and Wildlife Service's Salt Lake City Area Office's geographic area of responsibility includes Utah, Colorado and, in some matters, the Green River Basin of Wyoming. We have reviewed portions of the draft statement that apply to this area.

In general, the draft statement is well prepared, and does a good job of addressing impacts on fish and wildlife resources to the extent possible for such a broad programmatic proposal. However, the generalized approach fails to adequately cover some significant fish and wildlife problems.

Section 2.9: Overview of the need for a Federal Coal Management Program.

We wish to emphasize the importance of considering Federal coal leasing in conjunction with State and private leases. The objective should be a Federal-State-private combination that produces a pattern of development with the least total adverse impact.

Section 3.1.1: The Preferred Program

The seventh element of the preferred program," a strategy to integrate the environmental analysis requirements of the National Environmental Policy Act of 1969 in the new program", is extremely important. It is impossible for national and regional leasing programs to adequately analyze site-specific impacts or recommend appropriate mitigation measures. There must be a mechanism for identifying and solving site-specific problems on a site-specific basis.

2.

Table 3-1 on page 3-10: State Resident Fish and Wildlife

The three examples of criteria for lands unsuitable for development are inadequate. All areas critical to reproduction including nesting areas for sage grouse, elk calving areas, and antelope fawning areas will be considered. Migration corridors for all big game animals will be considered. All critical big game winter range should be included rather than only the most critical ranges.

Table 3-1 on page 3-12:

Under criterion and exceptions the last sentences for Falcon Cliff nesting sites are incomplete;

"Consideration of availability of habitat for prey species shall be." Add, "included in determination of buffer zones."

"Buffer zones may be increased or decreased if the land management agency." Add, "determines that the active falcon nests will or will not be affected."

Section 3.2.1.4 on page 3-21: Threshold Development Levels

We endorse the concept of threshold development levels for a given area based on land use planning rather than going solely by industry's expression of need. We also suggest that units of habitat may be a better criterion than actual numbers of animals or percent of population. Some wildlife populations fluctuate drastically from year-to-year within a given area of habitat.

4-25, and 2nd Column, 1st full paragraph, 2nd sentence:

"Fonelle" should be Fontenelle.

4-26. 2nd column, 1st full paragraph, 2nd sentence:

Should be "Kendall warm springs dace", (not darem). In same sentence the Utah prairie dog occurs in the Uinta-Southwestern Utah Region. It is doubtful if it occurs in the Green River - Hams Fork Region.

4-26, 1st Column:

After 4th full paragraph, insert "The sagebrush biome is a winter concentration area for golden and bald eagles."

3.

4-26.4.6.2: The Environment and Man

1st paragraph, Danger Cave is in Tooele County, Utah (not Wyoming). It is also outside the Green River, Hams Fork Coal region.

4-28, 1st Column, 2nd full paragraph:

"Seedshadee" should be "Seedskadee".

5-23, 1st Column, 5th paragraph:

The Uinta-Southwestern Utah Region has areas equally as adverse to Reclamation efforts as those mentioned.

5-8.1: Green River - Hams Fork Coal Region:

The endangered fishes mentioned are not supported by "the cold, clear waters of the Green River system." These endemic Colorado Basin fishes require the turbid, relatively warm waters of the lower elevations. The conversion of warm turbid waters to clear, cold waters by construction of reservoirs that trap sediment and lower summer temperatures is one of the main reasons for the decline of these species.

5-8.2: Uinta - Southwestern Utah Coal Region

Nesting areas for golden eagles and winter roosting concentration areas for bald eagles would be potentially affected.

Table O-1: Estimated Regional Carrying Capacities and Primary Productivities

The acres per animal figures for some big game animals are low. For example, one mule deer/100 acres in Uinta- Southwestern Utah region. The average capacity for 15 herd units in Utah is one mule deer/47 acres based on Utah Division of Wildlife Resources data.

We have attached to this memorandum a copy of the Utah State Division of Wildlife Resources' comments on the draft environmental statement for the Departmental Coal Management Program. We concur with their comments and ask that the Departmental Program be amended to accommodate the State Division of Wildlife Resources' and the fish and Wildlife Service's concerns.

This opportunity to comment is appreciated.

Mitchell E. Shedlock

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

20 MAR 1979 30281

OFFICE OF THE ADMINISTRATOR

Honorable Guy R. Martin
Assistant Secretary for Land
and Water Resources
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Martin:

We are pleased to provide you detailed comments on the Final Coal Management Program Draft Environmental Impact Statement. These comments are a supplement to our letter to you of March 2nd.

As we indicated in our earlier letter the Department of Interior has proposed in its Coal Management Plan an exciting and effective procedure for coal development. We are pleased with the proposal and the outstanding job in the preparation of the draft EIS. As you may be aware, members of my staff, EPA Region VIII staff and I were able to meet on March 13 with Joe Browder, Steve Quarles and others from the Department. The meeting allowed us to explore the merits of our recommended positions and to better understand the reasons behind Departmental positions on some matters. We agreed that EPA would follow up this meeting with a re-statement of its position to reflect this dialogue.

Since the meeting agenda was concerned with the five points in our earlier letter, we offer the following additional information on these points.

1. The unsuitability criteria need further refinement and consideration of other environmental factors that could affect suitability.

It was our recommendation that two other potential unsuitability determinations affecting coal leasing decisions be added--prevention of significant deterioration (PSD) from visibility impacts for Class I air quality areas, and sole-source/community drinking water aquifers. EPA was also concerned that the proposed reclaimability unsuitability criterion was not well integrated into the program.

We still maintain that these three criteria can and should be part of the unsuitability criteria. We do not believe, however, that the land-use planning (MFP) level should necessarily be the focus for these more

2

site-specific criteria. The complexities of reclamation potential, air quality modeling or groundwater flows cannot be defined a priori at the planning level, without good empirical data.

EPA is recommending that initial determinations for these criteria be made at the activity planning/tract evaluation stage, still prior to leasing. Here the evaluation is specific enough to allow for a realistic gathering of data on soils, geology, air quality etc. In the long term, as we suggest in our detailed comments, information developed at this stage (and subsequent mining plan review stages) could eventually be factored back into land-use plan amendments. For example, we suggest that air quality screening zones could be used in the MFPs when empirical data is sound enough. This data development will take a number of years, however, EPA will work with the Department to help develop analyses for air qualtiy and sole-source aquifers that could be used at the tract evaluation phase.

We understand that Interior had requested EPA participation some time ago in the development of unsuitability criteria. We apologize for our lack of participation but we hope the above recommendation can be incorporated into the final EIS of the program.

2. Water qualtiy and water quantity impacts will be of National and interregional significance, but are inadequately evaluated in the EIS. Our reviewers had difficulty in understanding the water quality values presented in the EIS relative to other available information. It was agreed that we would get the preparers of the technical information to discuss problems with EPA review staff. We do maintain that a better assessment of coal-related water quality impacts is needed, particularly salinity in the Colorado River Basin and trace metal impacts.

3. Management Framework Plans (MFP's) — the backbone of the Department's planning phase for the coal management program — appear inadequate. We think our choice of language to describe the MFP's inappropriately characterized the program for which we apologize. EPA's experience with MFP's reviewed in the course of EIS reviews has been that there are three principal deficiencies: lack of data in certain areas, resolution of resource conflicts highly skewed toward coal development, and lack of public access and agency review. I'd like to discuss these in turn.

We are principally concerned with the lack of data in MFP's that affected the coal leasing program. Following our meeting last week, we now understand that much of the critical environmental data needed for unsuitability determinations can be acquired at the tract evaluation stage as we discussed under point #1. There are other data gaps such as minerals data deficiencies that can be identified by one or more of the ongoing Interior Task Forces set up for this reason. We do think that Interior should formally assess and report its existing MFP's data needs (along the lines suggested on page 41 of our detailed comments) as soon as possible in program implementation.

3

Our second consideration regarding MFP resource conflict resolution may have been resolved in the development of unsuitability criteria. With the exception of conflicts between mining and grazing or timbering, other resource conflicts are now handled in the unsuitability criteria. EPA has no concern about management tradeoffs of grazing, timber and mining, as long as post-mining multiple uses can be restored (reclaimability issue).

Our final concern is the lack of published MFP documents and difficulty of having public and agency access. As we now understand it, Interior will publish an MFP supplement for those MFP's undergoing unsuitability determinations. This document will define the unsuitable/suitable areas within each MFP. EPA will reserve comment until we have had an opportunity to evaluate these documents; we would appreciate an advance draft copy if possible.

While we have seen some difficulties in using existing MFP's we are not suggesting that some phases of the coal management program could not be started soon. What is needed is a commitment by Interior to identify the most critical MFP data needs and to work toward acquiring the information. To what extent or whether this data acquisition would delay some portions of the program development we cannot determine at this time.

4. The status of existing Federal leases not in production and Preference Right Lease Applications (PRLA's) is still of concern. From an environmental standpoint, EPA's recommendations to comprehensively evaluate existing leases and PRLA's and try to retire in some fashion the most unacceptable leases makes good sense. We also think that a good faith effort to clean up "unfinished business" would also be positively received by the American public.

We are sympathetic with the Department's position as it was presented in our meeting. DOI's position has been that it will handle existing leases and PRLA's unsuitability determinations at the time of mining plan review. We understand that you have been advised by your Solicitor that the Department cannot evaluate existing leases and PRLA's for unsuitability at an earlier stage.

EPA's recommendation at this point is for DOI to publicly explain (to the extent permissible) the rationale for this position. As we understood it, the Department will be preparing a fairly detailed evaluation of existing leases and PRLA's for the final EIS. I would ask that EPA have an opportunity to review this dicussion prior to the release of the FEIS.

5. The Coal Management Program EIS has not explained how the new generation of "regional" EIS's will be improved over existing regional EIS's, and how the new regional EIS's will be integrated into the program. Our comments generally stand here, although the EPA comments do reflect an incorrect impression that some work had already gotten underway relative to the "super regional" EIS's. EPA still offers to participate closely in the scoping effort for these regional EIS's.

I hope this letter signifies EPA's desire to work closely with the Department in developing an environmentally compatibly coal leasing program. EPA does support the overall approach of DOI's program, particularly the use of land-use plans and unsuitability criteria. EPA will be ready to assist the Department where it can in developing a sound Federal Coal Management Program.

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Federal Activities (A-104)

DETAILED COMMENTS OF THE
ENVIRONMENTAL PROTECTION AGENCY ON
THE DEPARTMENT OF INTERIOR'S
DRAFT FEDERAL COAL MANAGEMENT
PLAN EIS

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DETAILED COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY ON THE DOI DRAFT FEDERAL COAL MANAGEMENT PLAN EIS

A. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

EPA believes that the programmatic draft EIS provides a generally adequate description of the program, and evaluation of most of the impacts and discussion of principal issues. EPA has environmental reservations in five specific areas that need further evaluation and resolution in the final EIS.

1. The unsuitability criteria -- are incomplete and need further refinement. Important criteria are missing, including prevention of significant deterioration (PSD), particularly visibility, for Class I air quality areas, parameters for reclamation potential, and sole source aquifer protection. The provisions for exceptions to the criteria as proposed may be too vague to be effectively implemented. Perhaps the single most important evaluation criterion -- reclaimability -- is poorly defined and not well integrated into the overall coal management program.

2. Water Quantity and water quality impacts will be of National and interregional significance, but are poorly evaluated in the EIS. Data presented on quantities of water needed for coal mining operations in water-short western river basins cannot be compared with Water Resources Council or other agency projections. Impacts on Colorado River salinity need particular attention. The EIS did not evaluate the potentially significant problem of trace metal contamination from mining operations.

3. Existing Management Framework Plans (MFP's) -- a key element in the Department's planning phase for the coal management program -- may not be adequate for their intended purposes in the program. Past MFP's suffer from lack of data in areas which will be important to the success of this program. Few have had public or agency review. Past MFP's were discretionary and had only advisory status and thus might never be fully implemented. Resolution of resource management conflicts in past MFP's indicated a strong policy bias in favor of coal development.

4. The status of existing Federal leases not in production and Preference Right Lease Applications (PRLA's) is still of concern. More detailed information is needed in the EIS on the unsuitability/suitability of these leases. EPA prefers that the Department should handle these leases within the context of the planning phases of the Secretary's preferred program. The first order of business should be to try to eliminate those leases and PRLA's of greatest environmental concern.

5. The Coal Management Program EIS has not explained how the new generation of regional EIS's will be improved over existing regional EIS's, and how the new regional EIS's will be integrated into the program. These regional EIS's have the potential for evaluating the cumulative impacts of lease offerings, and for defining the threshold environmental criteria which should be used as a basis for decisions. However, their role in the overall coal management program should be defined now, as decisions are made regarding the structure of the program.

RECOMMENDATIONS

1. As a consequence of our position that there are still substantive deficiencies in the proposed coal management program and because the EIS recognizes that some of the existing leases and PRLA's are unsuitable for mining, we are asking the Department to orient the Federal leasing program in the near term toward correcting past mistakes in existing leases and PRLA's. We urge the Department to concentrate on using both the land-use planning process and the leasing phase to identify unsuitable existing leases and PRLA's. Any leasing in the near term should be oriented toward replacing those existing leases that are unsuitable for mining. We are aware that other Departmental constraints may prevent this alternative from being implemented.

2. The unsuitability criteria should be expanded to include compliance with EPA regulations for the prevention of significant deterioration (PSD) for air quality involving visibility impacts near those Federal lands and wilderness areas falling under Class I. Sole-source drinking water aquifers should also be included in the criteria. Finally, an initial determination of reclaimability should be made at the tract selection phase before any leasing is done. This determination would require consideration of such factors as revegetation, hydrology, geology and soil conditions. EPA believes that the tract evaluation phase is the best point to evaluate unsuitability for these trace parameters.

3. The preferred program needs to strengthen the unsuitability criteria generally and improve the existing land-use plans (MFP's). This improvement should include a better definition data needs for program development and a commitment to develop threshold criteria into the land-use planning activity process. Better public and agency access is needed to review MFP's before the leasing process is started.

4. Water quantity and water quality relationships in the different coal regions should be better identified. In particular, activities in the Colorado River Basin need to focus closely on salinity problems, using data from recognized sources such as the Colorado River Basin Salinity Forum to predict cumulative water quality impacts. The Department will need to closely assess the potentially serious problem of trace metal contamination developing from mining operations in a number of coal producing regions.

5. The Department should move toward more of a problem-solving approach in the next round of regional EIS's to identify and resolve regional environmental-social problems. Threshold environmental criteria should be established in the EIS process. We request that EPA be named as a formal participant in the "scoping" process for these EIS's.

Our analysis of the proposed Coal Management Program indicates that we have reservations regarding the environmental acceptability of the program, and that more information should be developed for the final EIS to assess more fully the environmental impacts of the program. Our procedures require that our assessment of this program and the EIS be made available to the public, and that our overall evaluation will be published in the Federal Register as "ER-2" (Environmental Reservations/Insufficient Information).

There are also a number of other issues we have raised in these comments that the Department should consider in the preparation of the final EIS.

8. GENERAL COMMENTS ON THE EIS AND PROGRAM DEVELOPMENT EFFORT

1. We commend the Interior staff for the conscientious work shown in the draft EIS. The current version of the EIS on the Coal Leasing Program is a dramatically improved document. We notice an open discussion of problems and issues, and candor in discussing environmental impacts of the various program alternatives. The EIS is also more clearly written than past DOI efforts. Many of EPA's past objections to the programmatic coal leasing EIS have been obviated by the detail in describing the scope of the EIS, the program itself and the approaches used in discussing impacts, mitigation measures and impacts. Finally, we note a much more systematic evaluation of impacts through the use of well-developed modeling techniques and occasionally outside consultants as necessary.

We hope that the Department will continue to follow this splendid example in how to write a program EIS in its subsequent EIS efforts. Past DOI efforts have been overly formalistic, highly structured and very short on culling out issues of significance. We think this present EIS does a commendable job in initiating the spirit of the Council of Environmental Quality's new regulations stressing conciseness and attention to decisionmaking issues in EISs. We do think that larger print would be advisable in the final EIS in view of the extensive information contained throughout the document. The EIS could also use a comprehensive Table of Contents.

2. Current efforts of the Department to develop a Federal coal management program in this EIS, in proposed regulations, and at the field level, recognize the fundamental distinction between implementation of a long term program and a "transition" period. This distinction we think is critical to an evaluation of the consequences of any proposed program and is addressed again further on in our comments.

We believe that Interior's approach so far articulated in the EIS discussion in the BLM proposed planning regulations (Federal Register, Friday, December 15, 1979, pp. 58764-58777) and in the sample regulations (Appendix A, this EIS), does not pay nearly enough attention to the myriad of problems and issues surrounding transition. Resolution of issues such as the need for new Federal leasing and correcting past BLM planning deficiencies are part of the transition, and will continue to be focal points of controversy for some years to come. Wherever possible in our comments we stress where we think an issue or impact involves a short-term transition discussion or series of decisions. Ultimately we think that the success of the long-term program will rest on how well the transitional issues are handled.

3. EPA thinks that a number of important strides have been taken towards good Federal coal management with the currently preferred DOI program. We are particularly pleased with the development of unsuitability criteria to be used in both the BLM land-use planning process and the coal program. We feel strongly that advance planning to eliminate such sensitive areas from coal development before the leasing process is begun is an excellent step in the way of effective environmental planning. If the threshold criteria (discussed on p. 3-4) can be integrated into the program and perhaps identified in the regional EIS's many of the objectionable features of the coal leasing program can be minimized. Obviously, the more stringent review and approval requirements under the Surface Mining Control and Reclamation Act will also improve the long-term consequences of mining.

4. We do have a number of serious concerns about some of the elements of the preferred program and long-term environmental impacts particularly

affecting air quality, water quality and solid waste. The Draft EIS is vague in discussing the methodology for determining the amount of coal to be leased, examining certain environmental concerns and describing program implementation. These concerns are detailed in the following sections.

C. THE NEED FOR NEW LEASING

This question is at the heart of the controversy surrounding the Federal Coal Program as well as with recent litigation. The Department has developed an evaluation in Chapter 2 that attempts to demonstrate a rationale for leasing as early as mid-1980. Four factors are cited as reasons for resumption of early leasing:

*greater assurance of meeting National energy objectives;

*a means of promoting more desirable patterns of coal development;

*significant administrative and legal advantages to the Department and;

*improving competition in the western coal industry.

It is not EPA's intention to fully evaluate all of the merits of these arguments except where environmental issues of concern to EPA are involved. However, based on our experience with western Federal coal mining and energy related issues, we would like to add some considerations we feel are important to a resolution of the question of new leasing.

1. As a first step, the Department needs to present a detailed discussion of the status of the present Federal leases and PRLA's. We are aware from the earlier programmatic EIS, that the Department has made some evaluation of the environmental merits of existing leases and PRLA's. Yet this most critical discussion has not ever been presented for evaluation in a public document. We believe this should be presented in the final EIS. A necessary first step would be to identify the size and location via regional maps of these leases (with and without mining plans) and PRLA's in the final EIS.

EPA is also aware that the Department has begun an evaluation of high-priority Management Framework Plans in coal areas using the proposed unsuitability criteria. We have some reservations regarding the criteria as presently listed (discussed below). However, we think that an essential first step in implementing the transitional phase of the Federal coal program would be through unsuitability evaluation of existing Federal leases and PRLA's. Only when it is possible to determine the number and amounts of existing leases that are environmentally and economically unsuitable can an intelligent appraisal of needed new leasing be made.

2. Since the preferred leasing system will superimpose production levels from above (DOE national projections), it would seem important to have some idea of what the ratio of outstanding leases granted/actual production levels should be. At this point in time the ratio of coal tonnage potentially available annually (based on a 30-year mining life) to existing Federal production is something on the order of 15:1. Recognizing the numerous constraints to development, has the Department given thought to what kind of ratio would be appropriate assuming that most leased areas would be developed?

3. Although the assessment of likely coal production on pages 2-30 through 2-38 assumes current mining plan estimates of annual levels of production over a 30-year period, recent experience has shown that existing mines are capable of significantly increasing their production if the demand is there. We can find no legal or other obstacle under current legislation that would limit yearly increases in production. It appears that the economics of this approach are attractive, requiring minimal additional capital investment.

Increases of production beyond mining plan levels do appear to pose considerable uncertainty to those planners who will try to estimate future leasing needs. Has the Department tried to make an assessment of what

the upper limit of annual coal production is likely to be over time in terms of a minimum number of years of production from a lease? Are there any other practical constraints that would lessen this tendency to maximize production from industry's existing leases?

4. Although we can sympathize with the U.S. Government's desire to promote greater competition in the western coal industry, we wonder whether additional leasing will have any practical benefits in this regard. It would appear that willing producers not now owning leases could do so simply by buying them (through the assignment process). Will additional leasing change this situation in any discernable way?

Other reviewers have indicated that there seems to be a tendency to concentrate the leases that have been sold. Recent sales of leases have been to large corporations. We wonder whether a situation of greater competition among lease holders might result from new leases rather than among coal producers. We do recognize that diligent development requirements may alleviate this situation. We wonder whether a provision to eliminate re-sale of leases might further prevent concentration and speculation. Although there may be benefit in having re-sale of present leases, we can see no good reason why re-sale of future leases would have practical advantages to government or commerce. A lease could simply be returned and re-leased if necessary. Would a statutory change be necessary to implement such a provision, and if so, has the Department considered doing so? How will the Department police assignments that are made?

5. EPA strongly endorses DOI's concept of using the Federal Coal Management Program to correct past deficiencies, particularly in the area of retiring leases and PRLA's that are environmentally unsuitable. Given a workable and defensible set of unsuitability criteria evaluation and updating of land-use plans, and given a thorough assessment of existing leases and PRLA's via these criteria, EPA believes that a successful transition period leasing program could begin relatively soon.

We recommend that Interior approach new leasing in the short term as a corrective interim step toward a fully implemented coal leasing and management program. Ths first order of business should be the retirement of the most unsuitable leases.

EPA proposes that Interior consider new leasing on a one-for-one basis with leases identified as unsuitable. The Department should further strengthen this approach thru a detailing of this interim process through its rule making on coal management and BLM land-use planning. The Department could formalize the process for "trading" or acquiring "credits" in return for relinquishing undesirable leases and PRLA's.

From the standpoint of coal tonnage already under lease, EPA finds little justification for more leasing in the near term. Were some of the leases and particularly PRLA's now due for retirement in 1985 (if not under development) were gradually replaced by better leases, the 1985 crunch of due dates for leases could be softened, allowing more time for rational planning.

D. ENVIRONMENTAL IMPACT ANALYSIS

In a general programmatic treatise such as this DEIS, there are definite limitations on what kind of detail is appropriate for analysis. EPA, in the past, has faulted the Department for its lack of relevance in evaluating and discussing environmental impacts. Past EISs have been crammed with a great deal of information, that has little in the way of further usefulness for decisionmaking. Judgements of "significance" or "importance" are essential in sorting out the mass of EIS data into a meaningful evaluation.

To a great extent, the past approach has been modified on this EIS, more in line with the recent CEQ direction toward more concise and relevant EISs. EPA lauds the identification of "issues" in this EIS

and their often candid discussions. EPA will occasionally have disagreements on how the issues are resolved, but we certainly approve of the format that this EIS has demonstrated.

A second general improvement we note is a more systematic definition and evaluation of impacts. We think that as a general thesis, Interior has demonstrated to a reasonable degree that the Nationwide differences in impacts between alternative ways of leasing (or not leasing) coal are small compared to the basic decision (and trend) toward a rapid shift toward coal as the major source of new energy production. If anything, the quantity of impacts estimated in this EIS define the impacts expected from the National Energy Plan.

EPA still has some concerns, explained below, about various impact parameters, particularly those under EPA legislated mandates. There is still a valid question though whether much of the Nationwide impact data developed in this EIS will be useful for further decision-making. At this point, we don't have a full answer to this question except that for certain parameters in certain regions, there appear to be some constraints developing to the proposed schedule of coal extraction/consumption. A second possible benefit of this EIS data is that areas of genuine uncertainty in need of further research can be occasionally defined.

Our comments in this section reflect where we think that there may be a valid programmatic environmental issue (or not). For other parameters we accept Interior's position that such issues must be handled at the regional or even at the site-specific case. Our concerns about impact estimation found in Chapter 5 of this EIS are found below.

1. Water Quality/Water Supply

EPA considered this impact to be one of genuine national/regional concern. Water limitations could definitely put constraints on the proposed coal program. Unfortunately, the water resources/water quality portions of the Draft EIS on the Federal Coal Management Program are weak, poorly organized, and it is difficult to make any meaningful sense out of the information. It is not at all clear what specific

water uses are included in the various alternatives. Therefore, it seems to be impossible to directly compare figures in the draft with estimated water uses from other sources. As a specific example, we have attached water use estimates prepared by the Salinity Forum as Appendix A. These projections are about as good as any available; however, it does not seem possible to make a direct comparison between the Forum's projections and the figures in the draft EIS.

A similar problem exists when trying to compare information in the Draft EIS with the 13(a) study - Water for Energy Assessment, Upper Colorado Region. We think that the water resources/water quality data in the Draft EIS came from the WRC draft National Assessment. However, we are unable to determine whether this is the case.

We question some of the basic assumptions the DOI has made in estimating water requirements for the Federal coal management program. We believe that the staff should have attempted to integrate the consumptive water requirement estimates of the Water Resources Council (WRC) with the water requirement estimates of the Federal Coal Management Program alternatives. Double counting the water requirements for coal development (using both WRC estimates and DOI estimates) makes the entire water supply analysis that much more inaccurate. Further, we do not believe that the EIS can assume that WRC projections of water requirements (in 1985) for development of fuels and mining is similar to the projected estimates of consumptive water requirements of the no new leasing alternatives. For example, (using Table 5-13 and 5-14) water-short areas like the Uinta-Southwestern Utah and Green River Hams Fork Regions if developed would exert pressure to draw on the Green River and upper main stem Colorado River watersheds. The staff's estimates of water requirements in these two watersheds, with no new leasing alternative, medium coal option are 60,000 acre-feet/year and 36,000 acre-feet/year, respectively. These estimates are much higher than the estimates of the WRC for the Green River watershed and Green River/Upper Mainstem Colorado River watershed for development of fuels and mining (31,000 acre-feet/year and 36,000 acre-feet/year, respectively). Such discrepancies in consumptive water requirements for coal development in the year 1985 with no new leasing outline the need for using real water consumption figures in order to project accurate future water requirements for other coal options.

EPA believes that treatment of potential water quality impacts in this EIS is inadequate. Impacts on water quality could be severe. The EIS should specifically note that salinity in the Colorado River Basin is a major issue (national and international concern, billions of dollars of public funds to correct, etc.) and that coal development could have a significant impact on salinity. Another weakness of the draft is the deficiency in adequately addressing potential impacts on rare and endangered species in aquatic systems.

The EIS especially needs to assess the cumulative impact of strip mining on levels of salinity in the Colorado River system. Although there is a great deal of variability in the soils in the coal regions affecting the Colorado River, as a general rule, each disturbance of the soil profile through new strip mining could expose leachable materials to faster movement into the groundwater-surface water system. Further, ash disposal from in-situ powerplant development could also pose added long-term leaching potential to the Colorado River system. EPA thinks that an estimate of the likely effect on the Colorado salinity problem should be made with the various 1985-1990 proposed coal development scenarios.

A second potential water quality issue of interregional concern involves the presence of significant concentrations of mercury in the Powder River basin waters near existing mining operations. A study has been proposed by the U.S. Fish and Wildlife Service/Biological Services Program to assess the magnitude and details of the problem. Other coal mining areas should also be monitored to indicate whether this is a regional or more widespread problem. Selenium has also been reported to be a trace metal contaminant in surface waters and probably should be assessed in the same manner. The Final EIS should identify this problem and indicate whether any studies will be funded to evaluate the full dimensions of the trace metal contaminant problem. EPA would be willing to work closely with DOI in evaluating this problem.

2. Air Quality

The EIS places a great deal of attention on cumulating aggregate air emissions as a way of assessing air quality impacts. EPA thinks this approach needs to be stated in a proper perspective. Many of the potential air quality impacts described result from increased coal use, not from a planning and analysis procedure which attempts to determine the best way to produce coal. As the DES states:

> "While many impacts, both beneficial and damaging, can be directly attributed to coal production that would result from decisions made under such a program, a wide range of impacts would result from decisions about the transportation, conversion, and use of coal."

We submit that the principal air quality impacts are in the latter category. To be sure, increased air pollution can result from the production "coal cycle", e.g., exhaust from shovels, bulldozers, trucks and other equipment as well as increased particulate emissions from the loading/unloading operation. For perspective, it is necessary to understand that air emissions from sources associated with coal production are just a few percent of current national emissions.

While we do not disagree that a worthy goal is to minimize emissions attributed to coal production, the range of the incremental emissions from the six program alternatives is on the order of tons when compared to hundreds of thousands or millions of tons of emissions from the "no new leasing" option in 1985 vs. the present. While coal production seems to be a small part of the cause of air emissions, the choice between program options appears even smaller. Thus, the air quality impact of the DES seems to be almost trivial when aggregated. As pointed out in the document, the significant air impact will be on a site-specific basis which this programmatic environmental statement cannot address except through developing procedures such as land-use planning evaluations that can consider site-specific issues.

The programmatic EIS should recognize that the focus of air-quality impact issues for Federal coal production will lie with the potential conflict between coal mining/processing operations and environmentally sensitive air quality areas. Specifically, EPA is concerned about the leasing of coal in proximity to Class I air quality areas defined under Prevention of Significant Deterioration Regulations. Under these regulations, most of the emissions from coal producing/processing facilities can be adequately controlled with the notable exception of fugitive dust, a major problem in many Western coal producing areas. Visibility reductions over Class I areas are a genuine concern with new leasing. Problems of this kind have already surfaced at the Alton, Utah coal field. In our discusssions on Unsuitability Criteria we suggest a possible way of identifying these kinds of air quality impacts prior to leasing.

Other specific comments are enumerated below and are keyed to page numbers.

Page 5-53. The section which discusses emission control standards quotes EPA-proposed standards for power plants. It is difficult to understand the connection between power plant regulations and standards which would pertain to "production facilities using fossil-fuel steam generators."

Page 5-56. The reason for the inclusion of Table 5-29 is unclear. The text (page 5-53) mentions only SO_x and TSP, yet Table 5-29 also lists NO_x. Furthermore, comparison of state emission regulations is a very complex subject. We believe that the table is factually incorrect, e.g., New Mexico's TSP regulation, Arizona's and Ohio's SO_x regulations are not more stringent than the proposed power plant NSPS; and the Pennsylvania SO_x regulation does not apply to all areas of the state. References 78 through 83 appear to have been omitted or are misplaced.

Page 5-57. The purpose of Table 5-30 is obscure. While this material is factually correct, it is not used to develop any point.

Page 5-58. See comment for page 5-57.

Page 5-61. Reference?

Pages 5-62 through 5-71. We believe that material of this type would be best if summarized (perhaps national totals) in the document with the detailed results placed in an appendix. It would be helpful to have totals on Tables 5-39 through 5-43.

We are not sure how the Tables 5-34 through 5-43 were generated for nationwide emissions from all coal-related sources for the different alternative coal leasing programs. In particular, we find it difficult to see how there could be variations in SO_2 emissions (powerplant-related) as shown in Table 5-35, given the assumption that the nationwide new source performance standards for SO_2 emissions would be met as stated under Section 3.1.2. Yet on page 6-1, the statement says that "the impact analysis in the previous chapter does not include those mitigating measures required by law or regulations." The EIS should make clear the extent to which controls have or have not been placed on impact parameter estimates.

Since projections of end-use (basically powerplant combustion from the NCM model) define the level of expected impacts for various time frames and scenarios, the EIS should also make clear the number of actual new powerplants projected. The estimate of megawatt size should also be identified, particularly where industry projections are available.

3. Solid Waste

Given the prognosis of some 1 to 1.1 billion tons per year of coal to be consumed in this country by 1985 and higher amounts in 1990, some estimate of the fly-ash residual should be made. Assuming an ash content between 10-30% of the mined coal, we are talking about disposing of some 100-300 million tons per year. Disposal problems will differ regionally, but on a national level, such a magnitude of often toxic solid waste could pose severe localized groundwater problems. In the Eastern coal regions, greater leaching rates and acidic conditions could result in significant groundwater problems. We have already alluded to the problem this could pose in the Colorado River system. Some discussion of potential mitigation measures to lessen this impact needs to be considered.

4. Archaeological Analysis

Under the discussion of geologic impacts from coal extraction, the EIS categorizes impacts on archaeologic resources as site-specific. While this is ultimately the case, we wonder whether the proposed BLM-USGS assessment mechanism could not at least identify regional locations where there is a high probability of certain strata containing archeological fossil remains. Those strata likely to be affected by coal mining enterprises need to be identified early in the process. Eventually limited areas of such strata might even be included under unsuitability criteria, if the potential resource is valuable enough.

5. Noise Impacts

Little or no analysis of noise impacts has been made. EPA could agree that at this level of national analysis, noise impacts cannot be meaningfully evaluated since they are very site-specific. We do expect that the Regional EISs will evaluate noise problems on specific communities and in certain sensitive areas. The Colorado State BLM, for example, has been working with the Region VIII EPA office to define background levels in "quiet" rural areas as well as assessing how various coal developments will affect these levels and more typical urban noise level criteria. This information will be used in the West-Central Colorado Regional Final EIS.

6. Reclamation Potential Analysis (p. 5-17 and pp. 22-23)

The analysis of reclamation potential on these three pages is surprisingly cursory given the importance of reclamation as a national issue. The only descriptive assessment of reclamation potential is contained in Chapter 4 in the Description of the Environment. As we have discussed under Unsuitability Criteria, these statements on reclaimability appear as vague, unsupported conclusions with little recognition of the regional problems involved.

In a national programmatic EIS of this kind, it is appropriate to ask whether there are certain geographical portions of the country where for one or

another reason, reclamation cannot be assured and perhaps no surface mining should occur. Specifically we would think that in areas in the Southwest (portions of Utah, New Mexico, Arizona, etc.) where rainfall is sparse and soils are poorly developed, it may be that no form of reclamation can be assured at this point in time. If this is the case, perhaps Interior should consider delaying leasing in those areas until adequate research has established whether reclamation can be done successfully.

EPA questions too the use in this section (p. 5-17) of a maximum 15-year reclamation period to define reclamation potential. This value appears to have been drawn from NGPRP studies in the Powder River - Ft. Union Area. We feel extremely uncomfortable in seeing these values applied to the more arid San Juan, Green River and Uinta areas.

The upper limit of 15 years assumed for reclamation even in the NGP area may even be in question depending on the structure of the impact analysis. Does this value include artificial mitigating measures such as fertilization, irrigation and topsoil addition, or "natural revegetation?" In Section 6.1 of course, the EIS indicated that Chapter 5 analyses did not include required mitigation measures.

EPA suggests that a table be developed indicating natural or minimal effort reclamation times versus intensive, required reclamation efforts to meet the OSM-defined reclamation standards adequate for each coal region. The EIS should indicate the types of reclamation activities that will be needed along with their approximate cost.

7. Socioeconomic Impact Analysis

Socioeconomic impacts cover the broadest range of impacts, and to the greatest extent those kinds of impacts least well defined in protective legislation in the way of mitigating measures. This EIS does a creditable job in defining many of these basic "people" impacts on a programmatic level. We think that the most serious consideration as a next step is to identify what the Department can and will do to try to alleviate these impacts.

We recognize that in a broad statement of this kind, many more subtle local or regional socioeconomic impacts will be overlooked. Witness, for example, the problem of the effect of unit trains virtually paralysing towns like Gillette, Wyoming and Hotchkiss, Colorado for hours in a day. Another example of a localized type of problem occurs in the North Fork of the Gunnison Valley where even though coal extraction takes place on Federal lands which are on higher ground, the supportive structures (tipple, railroad, etc.) occur on private lands in the river valley where land-use conflicts can become extreme.

EPA believes that the focus for such problems is properly at the regional analysis level. The programmatic EIS needs to clearly indicate how this analysis will be handled. We shall discuss this issue in further detail in the discussion on Regional EISs.

8. End-Use Impacts

The DOI analysis on pp. 5-129 through 5-133 makes a fairly cogent case for why stipulations involving the end-use of coal cannot or should not be placed on coal leasing. EPA can agree to this basic premise. However, it has been our past experience that the DOI through its member agencies, particularly the U.S. Bureau of Reclamation and the U.S. Bureau of Mines, has been in a position to influence the end-use of coal through its policies and activities on water-use development and gasification studies and project development.

The Department of the Interior in its Water for Energy Program has developed agreements with at least two western states--Montana and South Dakota--to allow the use of some 700,000 acre-feet of Missouri River water for energy development. Past joint Interior-industry studies like the North Central Power Study appeared to smooth the way for numerous multi-megawatt powerplants in the west. The USBR is still developing various water projects in western regions for basically M&I (Municipal and Industrial) use.

Since the functions of the USBM have been partially split between DOI - DOE, the exact role that USBM will play in developing gasification

proposals around the country is still unclear. But given DOI and DOE's joint responsibility in managing the Federal coal program, it is a fair question to ask what the policies of these two agencies will be toward advocating one or another end-use of coal and where.

EPA thinks that DOI should recognize this national issue in this EIS and begin to formulate what its policies toward industrial energy-related water development and technological development will and should be. It is likely that such decisions will influence where the end-uses of coal will take place in the next 10 to 20 years.

E. EVALUATION OF ELEMENTS OF THE PREFERRED COAL PROGRAM

EPA vigorously supports the idea of "prior" land-use planning before leasing. As we have stated, we wholeheartedly concur with the application of unsuitability criteria at the land-use planning stage to minimize later leasing conflicts. The idea of the priority ranking of leases at the activity stage also is environmentally attractive but does contain some significant problems in how it will be implemented. EPA does think that this activity step of tract delineation, evaluation and ranking is essential to the program.

1. LAND USE PLANNING

EPA believes that development and use of effective land-use plans (Management Framework Plans) is one key to the success of the Federal Coal Management Program. The approach suggested in this programmatic EIS holds both considerable promise and difficulties.

a. Past Deficiencies

Although the Department is attempting to build upon existing Management Framework Plans (MFP's) at least initially to implement the Federal coal program, EPA has experienced many problems with these MFP's in past reviews. In the first place, the quality of the MFP's we have seen varies considerably. Some have seen extensive public and agency input and review, others little or none. Even in cases like the

Williams Fork (Colorado) MFP which is supposed to be one of the higher quality MFP's, a subsequent U.S. Fish and Wildlife evaluation showed that the MFP considerably underestimated wildlife resources.

We are also concerned that the management resolution of resource conflict has been slanted in the past highly in favor of coal development. Past BLM Washington Office directives we were shown had officially defined this as policy. If a fresh re-evaluation of competing resources were to be made, considerable change in existing MFP's might be necessitated.

As we indicate under our discussions on Unsuitability Criteria, existing MFP's may not have adequate data to evaluate unsuitability for mining in certain areas. We think this would be an unfortunate start to a coal program that could have many national benefits if done right.

We think that this programmatic EIS should define the status of existing MFP's that would be used in coal leasing regions. How many MFP's are involved and where are they located? How adequate is their data, and how many will need to be amended, revised or are not as yet completed?

b. Unsuitability Criteria

(b1) General Comments. The DEIS outlines on pages 3-8 through 3-13 the proposed unsuitability criteria to be used in conjunction with BLM land-use planning. EPA applauds this overall approach as a rational and long-awaited step in developing a sound coal management program. EPA recognizes and has comparable difficulties (in PSD and 404 responsibilities) in trying to develop early planning resolution of environmental issues that also require detailed legally mandated reviews.

As a general premise, EPA strongly believes that where determinations of environmental unsuitability/unacceptability must legally be made, that every effort be expended to define these unacceptable situations as early in the planning process as possible. In the case of this program, we think that such determinations should be made if they can before leasing takes place. We think that such an approach would have considerable advantages to the Department in clearing the way for faster production of coal from environmentally suitable leases. Industries would also not be faced with as long a period of time in obtaining necessary Federal and State regulatory permits. If we can reduce the time of uncertainty in the permitting process it is to the Nation's benefit.

EPA is faced with multiple legal determinations related to coal mining/processing that could result in an unacceptable finding. The principal responsibilities we are faced with include the following:

Air Quality

*New Source Performance Standards (NSPS) for Coal Preparation Plants

*Prevention of Significant Deterioration

a. Coal extraction/processing emissions on Class I and II areas

b. Visibility impacts with special emphasis on Class I areas

Water Quality/Drinking Water

*NPDES discharge permits in certain states (Utah, South Dakota)

*Section 404 Dredge and Fill Permits

*Sole-source aquifer determinations

Some of these permitting requirements such as NSPS are technology-specific, and are independent of location. Other provisions would come into play only in isolated instances (e.g. compliance requirements in air quality non-attainment areas for NAAQS), and we have not listed them here. It is those recurring determinations that have some relationship to land-use (and hence are related to where leasing should take place) that EPA would like to see integrated into leasing decisions.

We think that two of EPA's mandated reviews could be partially incorporated into the unsuitability determinations. These are 1.) PSD regulations affecting Class I areas; and 2.) sole-source aquifer determinations. Not every potential lease area will face these conditions. In our comments below we will discuss how we think they could be worked into the program.

EPA also has a number of concerns with the currently proposed unsuitability criteria in the draft EIS. We do think that these general provisions are an excellent beginning and need further refinement.

As presently contemplated, these unsuitability criteria would be applied at the land-use planning MFP stage. Very broad and easily definable criteria (such as delimiting existing Federal park lands and scenic quality buffer zones) can be applied in a relatively straightforward manner in a land-use plan.

As we understand the Secretary's preferred program, site-specific determinations would also be made at the mining plan review level as mandated under SMCRA. We think that this approach ignores a very critical stage where additional unsuitability determinations can and should be made -- namely the activity selection, evaluation and ranking step. It is at this

point that the locale is specific enough to evaluate reclamation, air quality and other parameters that simply cannot be handled in broad-based land use plans covering thousands of acres. The activity evaluation and selection stage has the added advantage of still occuring before a lease is granted.

We will discuss this approach under the various criteria we feel should be added to the unsuitability list.

(b2) Air quality considerations need to be added to unsuitability criteria. Specifically, Prevention of Significant Deterioration (PSD) could and should be worked into the criteria dealing with Federal Land Systems and Wilderness Study Criteria. We believe that it would be ill-advised to lease coal in areas where air quality impacts of mining would likely violate State or Federal standards. We already have such a case where an EIS dealing with the development of the Alton, Utah coalfield indicated probable violations of nearby Class I PSD areas.

EPA suggests that the evaluations of protection for mandated Federal lands be expanded to include PSD criteria. We also think that such protection should be afforded to wilderness study areas, particularly those recommended for wilderness inclusion or further planning by the Forest Service in their RARE II study. Similar protection is needed for BLM lands now undergoing wilderness study.

EPA believes that under its present PSD regulations that most coal mining operations will have little trouble meeting standards for Class II areas. The present regulations treat fugitive dust (normally the greatest proportion of particulate emissions from a surface mine) as a source that would be subject only to Best Available Control Technology.

Fugitive dust could pose significant visibility problems to Class I areas, however. EPA is currently developing regulations to define and limit visibility impacts to protect Class I areas. These will be forwarded to the Department as soon as they are available.

The Clean Air Act Amendments of 1977 (P.L. 95-95) give the Federal Land Manager and the Department of the Interior considerable discretion to protect air quality related values including visibility in Class I areas such as National Parks and wilderness areas. Section 165 (d)(2)(B) states: "The Federal Land Manager and the Federal official charged with direct responsibility for management of such (Class I) lands shall have an affirmative responsibility to protect air quality related values (including visibility)..." Further, under Section 169A (a)(2) the Secretary of Interior is to review and identify Class I areas where visibility is an important value.

EPA is still in the process of developing regulations to implement visibility protection goals in the Act. We do think that the coal leasing program should be made compatible with this area of environmental protection.

We suggest the following approach: The land-use plans should locate and identify existing and potential Class I areas potentially affected by coal mining in given MFP areas. A matrix of distance-maximum emission levels from a mining operation needs to be developed to define a minimum distance where there is a substantial likelihood that a potential mining enterprise would adversely affect visibility values. These areas could then be excluded from leasing.

A second set of emission level-distance values could be generated to indicate some maximum distance where mining would be unlikely to affect visibility values. The lands beyond this range would be considered suitable from a visibility standpoint (for some appropriate level of emissions). Lands lying within the two maximum-minimum values would need to be further assessed at the activity planning level if these areas are otherwise desirable for leasing.

At the activity level, some appropriate level of emissions would have to be specified to protect air quality values. Potential lessors could then decide whether additional mitigation measures needed would be worth complying with in order to mine coal. As we discuss under Reclamation Potential, some sort of hypothetical mining plan analysis appears necessary at this stage. An air quality modeling analysis would have to be performed where this criterion needs to be evaluated.

What we have suggested above would work in the long-term. First, obvious areas are screened out, and then a more detailed air quality analysis is done where there is a reasonable chance that visibility impacts will occur.

EPA recognizes that this is an extremely complex issue and one where, unfortunately, empirical data is limited. For the first round of the leasing program, it will probably be necessary to do air quality modeling initially at the tract evaluation stage. Eventually this information could be used in MFP revisions to screen out areas where likely visibility impacts will occur.

We suggest that DOI commit to an initial investigation of visibility impacts in the first tract evaluation stage effort. A number of potential lease areas should be selected with reference to distance from Class I areas. By varying the distances and number of leases (in a concentrated area) some idea of relative distances and amount of emissions in a small area that affect visibility can be gained.

EPA would be willing to work with the Department to help define these minimum and maximum distances for protection of Class I areas in the coal leasing program as well as to help develop air quality analyses that might be used at the tract evaluation stage. We are hopeful that at this stage of analysis before leasing, we could eventually eliminate the issue of whether PSD considerations would

restrict the eventual mining enterprise, before actual leasing takes place. We also recognize that the estimation of visibility impacts is still in its infancy and may need some years to be perfected.

(b3) Sole-source aquifers and important aquifer recharge areas should also be considered as areas unsuitable for mining. This is also another situation similar to air quality visibility that does not admit of categorical exclusions/inclusions. One principal reason is that information on groundwater, aquifers and aquifer recharge areas is scanty. EPA's mandated responsibility is to prevent damage to sole-source aquifer drinking water supplies from activities which are Federally financially assisted. At present, there are no formally designated sole-source aquifers in Federal coal-producing regions that we are aware of. That is not to say, however, that there are not such sole-source aquifers that could use legal protection.

At this point, we recommend that sole-source aquifer and important recharge areas for aquifers be added to the list of potentially unsuitable areas for mining, recognizing that much of the information will have to be acquired in the future.

We think that the first step needs to be revision of MFP's to reflect what is known about groundwater resources. USGS and other sources should be contacted to define where known aquifers lie in proximity to potential

coal leasing areas. Information would also have to be acquired to define where nearby communities obtain their drinking water. Some estimate would then have to be made as to how significant these aquifers are to the total municipal drinking water supply.

One reason for revising Management Framework Plans would be to allow public and agency input regarding domestic water supplies. Should a community petition to have an aquifer protected, the MFP should recognize such a petition in defining suitable/unsuitable areas.

A second area of consideration is that of important aquifer recharge areas. There needs to be a more definitive study to determine the locations of major aquifer recharge areas that might be impacted by coal mining. The MFP should assess within the planning area where the likely recharge areas are. We envision a more detailed evaluation of this parameter at the activity tract evaluation stage. Once again, EPA would be willing to offer what assistance it can in defining and protecting sensitive aquifer areas.

(b4) We are also concerned about the lack of physical parameters in the listing under unsuitability criteria. Except for a solitary criterion regarding reclaimability, there is little or nothing in the way of defining basic physical limitations on coal extraction and reclaimability. Most of the other criteria though important, are institutional in nature and simply reflect existing legislative requirements.

It is disturbing not to see any reference to soils, slope, precipitation, geologic stability, saline areas, subsidence areas, etc. All of the latter could be critical in determining the suitability of coal mining and eventual reclamation of strip-mined areas.

It is our understanding that DOI has already applied these criteria to about 900,000 acres of "high priority" coal areas. Apart from the fact that this prejudices the extent to which these criteria can be retroactively modified in the course of this EIS review, we are concerned about the level of information available to make these determinations.

It is our understanding that many of the planning units that were selected for this review did not have the necessary data to make evaluations regarding parameters such as slope, wetlands, wilderness areas, etc. The lack of such information should not be a justification for proceeding without it. We think that a careful reassessment by DOI is in order to determine whether the preferred coal lease program can even be initiated with these major data gaps in land-use planning.

We think that inclusion of these basic physical parameters involving reclamation potential is a sine qua non for a successful coal management program. A possible way to resolve this situation would be to adopt the approach suggested by EPA to evaluate parameters such as reclaimability at the tract evaluation phase.

We recognize the extreme difficulties in trying to quantify the variables involved in successful reclamation from strip-mining. At the same time, we are not reassured by the statements in the Description of the Environment Section, Chapter 4, regarding reclamation potential. The statement on page 4-34 regarding reclaimability of the San Juan Coal Region -- "All areas within the region can probably be reclaimed after disturbance, provided that topsoil is replaced...and adequate moisture is available..." -- does little to inspire confidence when one realizes that reclamation is a near impossibility in some of the San Juan areas precisely because of a lack of topsoil and moisture. We can find no statement regarding reclaimability for the Powder River area.

The assessment for the Hams Fork-Green River region states on page 4-26 that "the potential for reclamation of disturbed areas varies considerably within the region. By using the best available technology for reclamation, many of the limitations of soil and precipitation can probably be overcome."

EPA thinks that it is this "variation" in reclaimability that is at the heart of the question of unsuitability regarding strip-mining. It would appear foolhardy to consider mining even at the planning stage in geologic or soils conditions or areas of meager precipitation where reclamation is difficult or impossible.

We think that an attempt to define the more general aspects of reclaimability within and between regions is sorely needed. As an example, EPA, in cooperation with the U.S. Forest Service, has recently contracted for a study to develop a prediction model in estimating revegetation potentials of surface coal mined land in the west. Data is being collected from major coal surface mines in the west, including parameters such as vegetation characteristics of each mined site and surrounding unmined areas with native vegetation, techniques employed at site, age of revegetated areas, climatic features (precipitation, growing season precipitation and length of frost-free growing season), physical features of area (slope, elevation, soil characteristics in both mined areas and undisturbed areas), and other ecological information. Such information could be used to analyze potential recovery of mined areas as well as identifying the unsuitability of some areas for mining. In addition, past revegetation techniques can lend insight to future efforts leading to a higher potential for success. We strongly urge the DOI to engage in a similar study or analysis so that land areas requiring special attention and/or mitigation measures will be identified early in the decision-making process. As an example, areas of little precipitation such as the Hanna Basin coalfield in southeastern Wyoming (Green River-Hams Fork Coal Region) will not only require initial irrigation of seeded areas, but also careful selection of plant species.

We can sympathize with the extreme difficulty a Federal land manager would be faced with at the land-use planning level, in trying to determine the unsuitability in terms of reclamation. Numerous parameters are involved, and many are concerned with the degree of reclamability rather than a categorical yes/no situation.

At the same time, we believe that waiting until the OSM mining plan review stage after leasing to evaluate unsuitability is something to be avoided. The best compromise appears to be an initial evaluation of reclamation suitability/unsuitability at the tract selection and evaluation stage. At this point the potential leasing areas are delineated enough to permit a site-specific evaluation. We can see no way to avoid some form of hypothetical mining plan at this stage to do a reasonable analysis. Our discussions under Activity Tract Selection and Ranking addresses some of the problems involved with this approach. EPA does think that such an evaluation can and should be done.

(b5) EPA also has some concerns about the exception provisions for the unsuitability criteria. We do understand the need to remain flexible at the planning

level particularly because of the individuality of each situation. However, there are a number of provisions for defining and exempting the unsuitability criteria that appear to need better definition:

a. P. 3-8 on Federal Land Systems, can the "land management agency" make an effective unilateral determination as to an appropriate buffer zone?

b. p. 3-9 How will the land management agency unilaterally determine whether scenic quality will be adversely affected?

c. p. 3-10 What happens under State Resident Fish and Wildlife where valid differences of opinion on effects exist between State and Federal game managers?

d. p 3-10 Under Wetlands, can the land management agency unilaterally determine the impact on wetlands?

e. p. 3-12 Under Eagle and Falcon roost and nesting protection, can the land management agency make a unilaterial determination as to adequate habitat protection?

This list of concerns is by no means exhaustive. The general problem appears to be a lack of criteria to define when the

exceptions can be made. A corollary problem is whether the land management agency can make an adequate determination on these criteria without the specific agreement of other agencies who have expertise on the issue.

(b5) EPA is also very much interested in the wilderness inventory and evaluation of BLM lands now underway. We think the Department is taking an important step in trying to define wilderness potential of the 450 million acres of BLM land under its jurisdiction. We are somewhat concerned that the timing of the early 1980 leasing may compromise the wilderness study in coal regions.

We think that the final EIS should better articulate the schedules for wilderness study and coal leasing. EPA also thinks that the Department should clearly define what kinds of new activities are or are not permissible on areas inventoried as roadless and meeting minimal wilderness potential.

Finally, at such time as BLM land areas having wilderness potential are formally listed, we suggest that the air quality PSD criteria be applied around these areas at least for the duration of the BLM wilderness study and until Congress acts on Interior wilderness recommendations.

(b6) Involvement by the public should come into play when there exists some questions as to whether or not a tract meets unsuitability criteria, or when decisions are made regarding

tracts which will be given exemptions from these criteria. A formal mechanism for actively involving other agencies, industry and the public must be sought. A clearer commitment to consideration of outside-the-agency judgements should be indicated.

c. Threshold Criteria

EPA thinks that this is an extremely promising concept, that should eventually be worked into the MFPs. We recognize the difficulty in quantifying many of these threshold values at the present time. On page 3-21, the Department indicates that "it is not necessary to specify threshold levels in the land use plan" and that "later steps in the leasing process supply ample opportunity..." We agree with this statement as a general proposition, but we think that a careful delineation of how the land-use planning process will interact with these other phases of the leasing process is essential. Ultimately the MFP is the only plan specific enough to carry out many of the socioeconomic threshold impacts, but the MFP itself must rely on broader evaluations. At the same time, many cumulative impacts could probably be best defined at the tract evaluation phase. We have suggested under Air Quality Visibility discussions how this might take place. Such an effort could also help define cumulative threshold impacts from nearby or successive leasing.

EPA thinks that the identification and development of threshold criteria should be one of the priorities of the future regional EISs. This is discussed further in a later section.

We recommend that a formal process be set up in activity planning to utilize the threshold concept mentioned on page 3-21. The notion that "decisions may be oriented more toward impacts dependent on levels or

rates of development" applies directly in addressing environmental considerations. Yet, a discussion of threshold development levels was not included, and the appropriate place to consider thresholds was not specified. The threshold evaluation process should be included as an activity planning procedure.

d. Existing Leases and PRLA's

In addition to the revision of existing MFP's to meet unsuitability criteria for future leasing, the present leases and PRLA's should be identified and evaluated under the same criteria. Recommendations for or against development of these leases should be made at the MFP level. This analysis could also be integrated in the regional EISs or developed in the final programmatic EIS. We think it is important that a systematic evaluation of existing leases and PRLA's be made rather than a lease-by-lease action.

2. ACTIVITY TRACT SELECTION AND RANKING

As we have discussed in Unsuitability Criteria for air quality (visibility), sole source aquifers, reclamation and threshold impact criteria, the tract evaluation phase is a critical point in the early planning process. This is the principal step where specific lease areas can be screened out for unsuitability before major industry development commitments are made. EPA thinks that a major review effort is worth the price at this stage. As part of the development of the tract selection and ranking system, an environmental analysis will have to be performed on each specific tract. Such an analysis is quite site specific and would seem to presume the development of at least the most probable hypothetical mining plan to make a reasonable analysis. This would include the probable location of annual coal areas mined, reclamation needs, and locations of coal storage, preparation and transportation elements of the mining operation. Will the Department be able to make use of USBM experts or some other resource to develop these plans? Who will define environmental problems in the

air, water quality or any other environmental areas? Will OSM people be involved to make initial evaluations of reclamation suitability? This part of the program does seem to presuppose DOI's intention to pull together a fairly sophisticated multidisciplinary team to do the review and ranking steps.

During activity planning, tracts will be ranked based on coal quality, cost, and environmental, social and economic effects and selected for sale. No indication has been given, however, as to how this ranking would be approached. The Office of Energy Activities at the Environmental Protection Agency in Region VIII has recently (November, 1978) compiled a study with the consultant, SRI International, which sets forth a methodology for representing and comparing the effects that might be expected from mining coal from particular tracts of land. This study could be utilized in proceeding with the ranking process.

In ranking tracts, coal content should be a major consideration. Due to environmental impacts from coal combustion, the most desirable coal is low in ash, sulfur, and trace toxic elements content. When the ash, sulfur, and/or toxic element level of coal varies significantly within a region, the best quality coal should be sought for development.

EPA agrees with the idea of a regional ranking of tracts, but we wonder whether a practical single value ranking can be made with so many disparate factors such as economics, coal quality, environmental desirability and all of the other concerns involved. It would appear that above a certain minimum qualification in these different areas, many tracts might be suitable. Also, if one area is slightly closer to available transportaton, but less suitable for reclamation, can these disparate units be commonly compared?

3. DOE PRODUCTION GOALS - SUPPLY AND DEMAND ANALYSES

a. To determine coal production estimates, an input will be the national demand for coal as derived from DOE's national coal model (NCM). Several assumptions in the model appear questionable:

*Transportation costs are underestimated. While the high-level projection seems reasonable, the mid-range case and the low case should reflect 1977 ICC rates with a 1% and 3% annual real escalation over current rates, respectively. Moreover, ICC rates for coal may be escalating due to inflation at a rate much greater than the assumed 5.5% per year.

*Synthetic fuel production levels are greatly overestimated in the model, and should be re-evaluated and documented more completely.

*Some of the wage rates (labor costs per ton of coal) used in the model may be too low. There has been a decline in productivity of eastern mine workers, a factor which should be taken into account in wage rate projections.

*In specifying utility environmental regulatons, it should be clarified that the low-level assumption of 90% FGD is based on a monthly average. Further, the mid-range assumption should be changed as follows: 90% FGD (monthly average) using eastern high-sulfur coals and 60% FGD (monthly average) using low-sulfur western coals. It should also be noted that the 90% FGD (monthly average) will be needed in many western areas, either as a result of New Source Performance Standards or Prevention of Significant Deterioration regulations.

b. In projecting coal production levels--a key component in determining the magnitude of the coal leasing program--the need for "judgemental decisions" has been indicated (page 4-7). Yet, the basis for these decisions was not discussed. For example, how has the NCM been judged against coal industry and other forecasts? Further, which projection level (mid, high or low) will be utilized by DOI in deciding how much coal to lease? In that regard, we assert that the high-level estimation of production is unrealistic and should not be utilized; the probability that all the

assumptions made in the NCM's high-level run will occur simultaneously is extremely small. In any case, the development and proposed use of the production levels must be further explained.

c. Chapter 2, Appendix H and to a certain extent Chapter 5 of the DEIS discusses the projections of coal supply and demand. On page 5-3, the assumptions and analysis guidelines are set out for the coal impact estimation program that is in turn based on coal supply and demand projections.

One of the key assumptions made in this analysis is that "labor, equipment and capital shortages will not significantly distort the projected levels or timing of the Federal coal management program." Yet in the same Chapter 5, a very candid and striking analysis is made of the huge capital and equipment shortfall that faces just the railroad transportation sector for projected 1975-1990 production and distribution. The analysis concludes on page 5-113 that "the railroad industry's current financial posture is relatively anemic," and that $1 billion dollars per year of externally generated funds would have to be invested through the year 1990.

We think the analysis is an excellent one and should be extended to other sectors of the coal production/distribution/consumption picture projected for 1985 and 1990. For one, can adequate coal extraction equipment (power shovels, draglines, etc.), be produced in the 1985 time frame? What magnitude of investment will be required in fossil-fuel steam generation facilities in order to be able to utilize the projected coal levels? Can this in fact be accomplished in the relatively short term 1980-1985? What degree of conversion to coal from oil and gas powerplant or industrial facilities will be needed? We think such an analysis would be extremely useful from both a supply and demand side to determine whether such projections can be met and to assess the relative level of nation-wide impact.

4. EXPLORATION LICENSES

This area of activity is not specifically discussed in the body of the EIS, but the sample regulations in Appendix A make provision for it. It is not clear at what point in the overall coal program where industry exploration would be most appropriate.

We find the provision cited in Section 3461.3 to allow exploration in areas defined as "unsuitable" somewhat puzzling. Allowing exploration in such areas would seem to be just creating future management problems for the BLM or other Federal land managers. Certain unsuitable areas (such as proximity to national parks or eagle habitat) would seem to be particularly inappropriate for exploration. As a minimum, the land manager should be allowed in the regulations the option of prohibiting exploration on unsuitable areas. Allowing such exploration should only be done after consultation and agreement with other experts or responsible agencies identified in the unsuitability criteria discussion.

5. EMERGENCY LEASING

Although the Department seems to suggest in the EIS discussion (p. 3-27 and in the sample regulations (Section 3425) that the emergency leasing system would not be used as an alternative to competitive leasing, EPA is unsure of how the procedure would work. We have indicated in our discussions on "The Need for New Leasing" that there can be strong economic temptations by an industry to increase its annual production output beyond that contemplated in the original mining plan. There should be assurances that the emergency leasing system will not allow a great amount of coal to be leased on a given mining operation than in the original lease. The Department should provide more specific examples of when the emergency leasing provision would apply for the criteria identified in Section 3425.2.

6. DATA NEEDS AND STUDIES

EPA thinks that the data evaluation study outlined on pages 3-42 and 3-43 of this EIS is a very critical one. The preferred coal program cannot be realistically developed unless the level of available information is assessed. We hope that the conclusions to this study will be made prior to the startup of the program. We also think that public and agency dissemination of this information is important.

In view of our comments on the data deficiencies in the already ongoing land-use planning revisions using unsuitability criteria, we encourage the Department to include this aspect in its data needs analysis before proceeding further on implementing this program.

7. PROCEDURES FOR EXISTING LEASES AND PRLAs

We suggest that the Department include in its proposed regulations more detail regarding how the Department will handle existing leases and PRLA's at renewal time. If the Department should be willing to adopt EPA's suggestion regarding the early start of the leasing program to trade or exchange unsuitable leases, there would need to be specific regulations outlining this process.

F. ALTERNATIVES

Two areas of coal leasing occur to us that have not really been evaluated under the basic alternatives. We simply submit these for your consideration:

1. Using the EMARS "activity" approach involving industry nominations once the basic land-use/tract selection unsuitability criteria of the preferred program have been applied. This approach would be based on industry indications of need rather than the DOE projections.

2. Federal leasing in checkerboarded areas where private or State leases are held.

The latter may require some explanation. Since the Federal land management agency does not have jurisdiction

over some coal mineral rights (particularly involving railroads), as well as many surface areas, how will the preferred program treat those adjacent Federal leasable areas? Will the full land-use planning process be applied to these lands as well? Will the agency initially evaluate the leasing of these areas as a whole irrespective of ownership or assume the fragmented land ownership as a constraint to production?

G. FUTURE REGIONAL EISs

The Department has already committed itself to the specific idea of writing "super" regional EISs on some of the coal producing regions. As a major reviewing agency of Department of the Interior EISs, EPA is very concerned that the unfortunate experience in the last generation of "regional" EISs be avoided. EPA does not want to see EISs being written for their own sake simply to follow procedural requirements. EPA reviewed all of the last set of regional EISs and has formally expressed its discontent to Assistant Secretary Martin by letter of July 6, 1978, and we think that CEQ's recent directive for more concise EISs oriented toward realistic decisionmaking is very important here.

EPA strongly believes that "scoping" the content and the form of these future regional EISs is absolutely critical and should be accomplished as early as possible in the EIS development process. The last generation of regional EISs suffered from a lack of focus as to what the EISs were supposed to accomplish. The EISs as they now stand contain a cumulative summary of impacts expected from outdated mining plans. Regional information, while compiled in massive amounts, has not been developed in any way we can see that has future usefulness to good decision-making.

EPA would be definitely interested in helping to define the scope of the future regional EISs. We hope it is obvious from the earlier comments that we can see much promise in this DOI coal management program, and that our comments are hopefully constructive as to what can and should be done to improve the program.

Our first question in developing these "superregionals" is how does the Department plan to utilize the tremendous amount of work and effort that went into the original 8 regional EISs on mining plans? The EIS is not even clear as to which regional EISs coincide with which "superregional areas." We think that

the West-Central Colorado area is included in the Uinta-Southwestern area, but no mention is made of this area in Chapter 4 of this EIS. A list of superregions with their inclusive areas should be identified in the programmatic FEIS.

We think that the greatest salvage value to the past regional EIS efforts lies in the extent to which special regional environmental-social problems have been identified and discussed. Hopefully, this information could be extended and made part of an initial "issues development" paper that could be expanded upon and made available for public and agency review during the scoping process.

We can see the need for extensive public and agency involvement at the early stages of planning for these superregional EISs. Local citizens can better identify the types of overriding issues of a socioeconomic kind that the EIS can focus on. EPA would be willing to scour the past regional EISs to identify areas of priority regional concern in each region from the perspective of its own mandates. Given a set of thoroughly developed issues from both the public and responsible agencies, the EIS effort could then be focused towards the better evaluation and possible resolution of many of these real-world problems.

We do think that these EIS evaluations need to be concrete; for instance, it is not enough to talk about railroad crossing problems in the Powder River EIS in generalities. The question of what can and should be done in Gillette, Wyoming (or other known problem areas) should be evaluated.

As a general presumption, we think that the superregional EISs need to discuss socio-environmental concerns that cannot adequately be handled at the land-use MFP planning level. In the example we gave of the North Fork of the Gunnison, if a local Federal MFP cannot adequately evaluate off-BLM land impacts, the regional EIS should do so.

EPA also thinks that the superregional EIS is a good place to identify and develop the idea of threshold criteria. We think that in this initial go-round of regional evaluations and updating MFPs, that the precise identification of threshold criteria is still to be developed. The EIS emphasis now should be toward a better understanding of how these criteria can be

developed and how they would be applied. We can see both the likelihood and the need for intense public debate on these issues. In many cases local or regional governing bodies would be helping to define their own environmental and economic futures.

EPA has already stated its preference that any new leasing be strictly geared on an interim basis towards correcting past coal management deficiencies. By this we specifically mean identifying and evaluating the environmental, economic, and social merits of existing but as yet undeveloped Federal leases and PRLA's. We sincerely hope that this will be the focus of the renewed Federal coal leasing program and the first round of "superregional" EISs. In this we assume of course that the Department has no option but to proceed with the granting of legitimate PRLAs.

We can also see a need to include the important MFPs in this regional EIS evaluation. EPA is uncertain whether to recommend EISs on individual existing MFPs in coal areas now undergoing re-evaluation with unsuitability criteria. We think that if the superregional EISs cull enough of the MFP descriptions (at the management and conflict resolution level) to identify the basic plans, resource tradeoffs and especially identification of unsuitable areas, that this information in the regional EIS would better substitute for individual EISs on MFPs to be used initially in the coal leasing program start-up.

Given the concurrent wilderness study areas by BLM, we think that such areas of inventoried wilderness and any priority areas for wilderness recommendation also be identified in the regional EISs.

A last issue of concern for EPA in the superregionals is end-use considerations of coal mining. We admit to not having a definite recommendation at this time because of the complexity of the issue. It obviously does not make much sense to evaluate the end-uses of coal in a coal producing regon a) if you don't know where it is going to end up or b) if the coal will be burned out of the region. On the other hand it makes a great deal of sense to concurrently handle in one EIS a coal mine and nearby mine-mouth powerplant. An added area of uncertainty on this issue from our perspective is the status and extent of DOE regional projections and other DOI activities regarding industrial water development. If either or both of these activities identify likely

future end-use locations of coal, these should be factored into the regional EIS analysis. EPA would be willing to accept a position of negotiation of this issue at the time the superregional EISs are undergoing the "scoping" process.

H. COMPLIANCE RECOMMENDATION

The Department should consider the use of stipulations similar to those found in air and water quality legislation that might prohibit a company from obtaining a new lease if the company was in violation of SMCRA regulations or the appropriate management regulations on another coal lease. In the Final EIS, the Department should evaluate the legal ramifications of such an approach.

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Mr. Frank Gregg
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Dear Mr. Gregg:

We have reviewed the Draft Environmental Statement for the Federal Coal Management Program. We realize these comments are late and unusually lengthy but hope they can still be considered in preparation of the Final Environmental Statement.

Our Minerals and Geology Staff has participated in various aspects of developing the Federal Coal Management Program. Ideally, we would have been involved in the process on a continuous basis, but personnel ceilings and funding did not permit that level of participation.

Our main efforts have been aimed at getting recognition of NFMA, the Forest Service land management planning process and Forest Service consent authority for leasing and operating plan approvals, as provided by the Federal Coal Leasing Amendments Act of 1976.

While these concerns have been fairly well incorporated into the subject EIS, there are some areas which still warrant change:

1. Chapter 3 creates a significant misapprehension that the Forest Service has the statutory authority and responsibility to plan for the disposal of coal. We believe any such connotation should be removed from the text in publishing the Final Environmental Impact Statement, and that such authority and responsibility be recognized as a function of the BLM.

The problem starts to surface in Section 3.1.1.1 Planning Systems with the statement that the Department of the Interior would rely on the land management agencies' planning systems in both the land use and activity planning stages to provide the initiative and the forums for decisionmaking regarding the Federal coal program.

In the discussion under Section 3.2.2 Activity Planning it states that, on completion of the land use plan, preliminary tracts would be identified within the areas designated acceptable for coal mining. In delineating the tracts, the land management agencies would consider such items as:

(a) technical coal data, including reserve tonnage, sulphur content, etc.;

(b) coal conservation, including maximum economic recovery, etc.;

(c) expression of coal mining interests on adjoining lands, etc.;

(d) surface ownerships, including terms of private surface owner consent, etc.

In essence, BLM's activity plans are analogous to Forest Service functional plans. However, we know of no Forest Service authority, under either the old or new planning concepts, which would allow planning for disposal of a specific mineral resource other than common varieties, such as sand and gravel.

The Federal Coal Leasing Amendments Act of 1976 contains a mandate that the Secretary of Agriculture take into consideration any proposed coal development in "comprehensive land use plans." It further states that the Secretary of Agriculture shall include an assessment of the amount of coal, identifying the amount which is recoverable by deep mining, and the amount recoverable by surface mining operations.

We perceive these requirements will be met in the process of developing the multi-functional Forest plan. Forest planning will also be the forum in which lands suitable for coal mining are identified, as well as giving broad consideration to the impacts from such activity.

2. The functions shown for the Forest Service in Table 1-7 should be broadened and rearranged, as follows, to more nearly reflect a balance of programs:

--land and resource management planning necessary for the administration of National Forest System lands and the management of renewable natural resources;

--the development of lease stipulations and the exercise of consent authority in lease issuances and mining and reclamation plan approvals;

--the issuance of easements and permits for ancillary facilities off the lease area;

--the administration of an abandoned mined land reclamation program.

3. The purpose and major relevance columns of Table 1-5 should be reworded to reflect the primary impact of the National Forest Management Act of 1976, as related to coal mining:

Purpose: Provides for a comprehensive system of land and resource management planning for National Forest System lands.

Major Relevance: Key factor in the Secretary of the Interior's determination of where coal leasing will occur.

4. The major relevance column of Table 1-5 should be reworded for the Multiple Use-Sustained Yield Act of 1960 to align it with FLPMA:

Major Relevance: Mandates land management principles similar to those required of the Department of the Interior under FLPMA.

5. The discussion under Section 1.3.1.4 Mineral Leasing Act for Acquired Lands, regarding consent authority, should either be eliminated or lead to the recognition that the Federal Coal Leasing Amendments Act does not differentiate between acquired and public domain lands in its consent authority provisions.

6. The end of the second paragraph under Section 1.3.2.4 Other Federal Agencies with Coal Related Responsibilities should be changed from " . . . leases in National Forests" to " . . . leases on National Forest System lands."

7. In Section 3.2.1 Land Use Planning, the term "Unit Plans" in the second paragraph should be changed to "Forest Plans."

8. In example regulations 3400.0-4 Responsibilities, we suggest the Forest Service planning responsibilities under NFMA be recognized. Similar recognition should be included in 3420.1-5 Requirements for Land Use Planning.

To our knowledge, there are no guidelines by which conflicts between oil and gas and coal production can be controlled or mitigated. Conversations with industry and governmental agencies have indicated that the two activities can occur on the same ground, but that protection of the oil and gas well(s) and pipelines would be required. It is the general opinion that leaving coal barriers or pillars to protect the

wells and pipelines is perhaps the proper solution. If our information is correct, it would require leaving a coal pillar 2,000 feet in diameter to protect an oil or gas well where the coal is 1,000 feet below ground surface. This is assuming an angle of draw for subsidence of 45 degrees. Using an average coal thickness of 10 feet, this would result in the leaving of about 1,000,000 tons of coal for each well. A like amount would also be left for protection of each 2,000 feet of pipeline. This generates the following questions:

1. Are supporting coal pillars a proven method for the protection of oil and gas wells and pipelines?
2. Is this an acceptable method?
3. Who would be responsible should damage to an oil or gas well occur from the effects of coal mining?
4. Who would be responsible for the coal resource loss? For the coal value lost?
5. Would the coal company be given other coal to compensate for that lost?

Other questions which we feel require clarification are concerning the mining of coal across abandoned oil and gas wells.

1. What would be the necessary (perhaps legal) procedure for a coal company to be allowed to mine through an abandoned well?
2. Are there potential hazards from gas seeping from an abandoned well into the mine?
3. Should each well be considered on a case-by-case basis?

We recognize that such responsibilities lie with the Department of the Interior, however, as a managing agency, the Forest Service has responsibility for management of the surface lands and resources. Such management is greatly affected and can be changed considerably by mineral activities. As a surface manager, responsibility for all mineral activities off lease fall on the Forest Service, i.e., permits for pipelines, roads, off lease structures, etc. We feel it is necessary that the above questions be resolved so that (1) conservation of the mineral resources can be attained, (2) the mineral industries involved can plan under the constraints of the conflicts, and (3) provide the Forest Service guidelines necessary to carry out their land management responsibilities.

Several additional comments are as follows:

1. The rationale used for redefining the 12 coal Regions to cause the preparation of new coal ES's is not clear (pages 1-4, 1-5 DES).

2. The delineation of the new Regions does not follow any normal Federal land management agency jurisdiction/planning boundary.

3. The delineation could make it difficult to obtain concurrences in the leasing process because the new coal Regions would cross state boundaries.

4. The process has a built in "chicken-egg" enigma relative to tract leasing (especially so for underground mining). Namely, the resolution of the issues raised in land planning unsuitability criteria, resource evaluation, tract selection and ranking, Regional production quotas, State government, public and industry views, site-specific impacts, and cumulative effects. Unless the data is available from all sources simultaneously, it would seem impossible to reach a decision.

We appreciate the opportunity to review this statement and apologize for the delay in forwarding our comments. We plan also to participate on the interagency panel wherein final changes to the environmental statement will be discussed and additional problems resolved.

Sincerely,

R. MAX PETERSON
Deputy Chief

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